Telephony

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THE TELEPHONE REPEATER

By Samuel G. McMeen

IN THE very beginning of telephone application it was hoped and desired that speech might be held between points very widely separated. The man who first predicted speech by electricity between distant points, Bourseul, mentioned Paris and Vienna as places between which the spoken word should pass by telegraph. The desire grew very naturally out of the convenience on the one hand and the clumsiness on the other which the telegraph had shown itself to possess. If telegraph facilities, chiefly important for distances of more than a few miles, had not been familiar at the time the telephone appeared, the desire and demand for true long-distance work naturally would have been slower in appearing.

With single wire telephone lines and the instruments of limited range which were first accessible, twenty-five or thirty miles was a reasonably commercial maximum. Yet at the same time telegraph lines were working for several hundred miles, even if of a construction which would to-day be considered crude and if not assisted by any intervening mechanism. But the demand for really long-distance telegraph work had been so great in former days that means had been devised for repeating the message from one circuit to another without first writing it down and then resending it upon the second circuit. Such a contrivance grew naturally from the experience with the telegraph relay. As the relay possesses the power to receive dots and dashes of rather feeble current, and by making corresponding contacts to repeat these characters in a circuit containing a register or sounder, they could be made strong enough or loud enough for easy reading even though the motion and power in the relay were very small. The mere lengthening of wires leading from the relay enabled these signals to be repeated into a second circuit, and by a rather complicated but fundamentally simple addition, these signals could be transmitted not only in one direction but in the other as well. This enabled a circuit containing one or more repeating stations to operate in substantially the same way as a simple circuit not so equipped, and a real benefit was conferred on telegraph practice. Without such an arrangement larger wires of a better conductor with a better insulation would have been required for the longer telegraphic distances. For these reasons the repeater conferred a great benefit upon telegraphy with the same order of benefit met later by duplex, quadruplex and multiplex devices, all tending to keep down the cost of construction required for a given amount of business.

With such a history as a spring for desires and hopes, the telephone industry progressed through the adaptation of copper to open wire lines, the adoption of metallic circuits, and the use of heavier conductors, until with the aid of better instruments perfectly satisfactory transmission up to eight hundred miles, and possibly transmission to twelve or fifteen hundred miles, had been reached. But so great an extension involves an investment many times greater than that required for telegraphy over the same distance, and but one conversation is possible on such a circuit at a given time. Fortunately, some telegraph facilities may be afforded by this circuit even during voice conversation, but under present conditions the toll for talking must be high because of the greater length of time than that of conversation upon which a given vocal message must support the investment.

If, then, the telegraph repeater could be imitated for telephony, circuits of a given size of wire could be extended in length, and perhaps—still more valuable—circuits of a given length might be built of smaller wire, with a reduction not only of investment but of tariff.

The search has been lengthy and anxious. At one time it was popularly rumored that Mr. Charles J. Glidden kept standing an offer of $1,000,000 for a practical telephone repeater. Whether true or not, such a sum fairly represents the market value of a device adapted to receive feeble voice currents and to produce and send forward stronger currents of the same character. The most natural method of attack of such a problem is to couple together a receiver and a transmitter. Because of the fact that the transmitter receives its current from a local battery, which may be made of considerable strength, the problem appears capable of solution at once by those means. A trial of such an arrangement immediately proves that received speech may be transmitted and many changes rung upon the dimensions and mechanical arrangement of such parts.

Fig. 1 illustrates the general relations, *a* being intended to represent the receiver core and its winding, *b* a button of the solid back type, of which *c* is an iron part closely related to the free pole of the receiver. It is quite evident that magnetic changes in *a* will cause a vibration in *c* with a consequent production of alternating current in the induction coil *d* and so to the line. It is evident, however, that voice currents coming to the repeater from the circuit containing the induction coil *d* will not be repeated so readily into the circuit containing the receiver *a*, and beyond this there is the difficulty, as has been said by others, that such an arrangement at best only re-transmits speech a little poorer than if the whole circuit had been a simple one without the introduction of any repeating device whatever.

Most inventors who have worked upon the telephone repeater problem have begun with the natural method suggested in Figure 1, and some of them have carried their research far enough to include methods of working both ways, which in themselves have no grievous faults. But no

repeater of this kind appeared carrying such promise and giving such results as to cause its general adoption and to enable the desired economies to be effected.

As pointing the direction in which investigation ought to be carried, it is interesting to note the statement of Mr. Miller in his work, American Telephone Practice, and in some discussion of the problem before one of our engineering societies. As representing the state in which the repeater

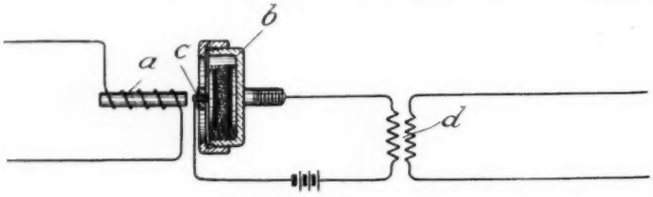


Figure 1.

art rested only a short time ago, Mr. Miller says that the "telephone repeater may be made to work perfectly on ordinary lines, but it has not shown its ability to transmit speech between two distant points any better than, or quite as well as, could be done by direct transmission without the use of the relay at all. The amount of energy received by the electromagnet of the relay is so exceedingly small that it does not seem capable of producing the desired mechanical effect upon the microphone contact. Something more subtle in its action that the microphone contact, a medium devoid of all mechanical inertia, is evidently needed."

In the public discussion referred to, the same author reiterated his point that the surest and largest results certainly would come by eliminating mechanical inertia from the actions of the repeater, and by implication that the best repeater, other things equal, would be that having the least inertia of parts required to move.

Six years ago Mr. Thomas D. Lockwood contributed a series of three articles to the Electrical World bearing on this fascinating topic, and it is interesting to re-read those and the editorial comment aroused, in the light of recent telephone and repeater history. In the first place Mr. Lockwood's exposition of the state of the repeater art in 1896

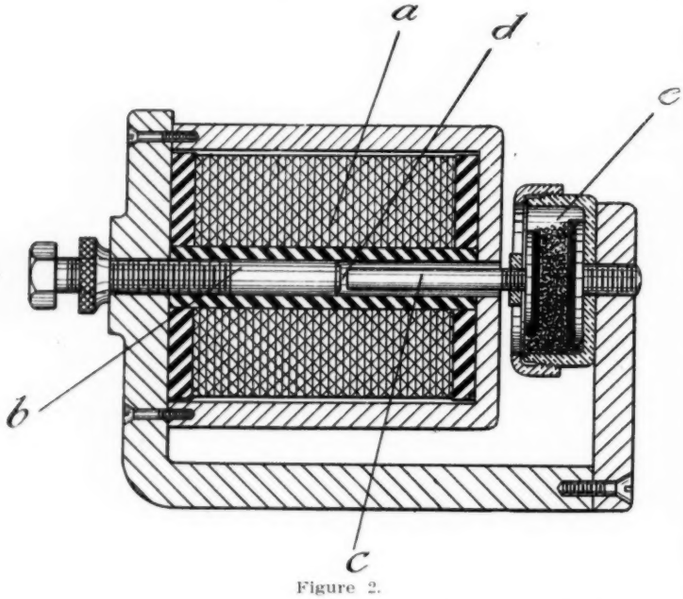


Figure 2.

was a full and complete recounting of the work which had been done up to that time by Edison, Ludtge, Thomson, Houston, Hughes, Rood and Gilliland, and in the second it contains much in the way of prophecy, which is of interest in the light of what has happened in the ten years since elapsed.

The work of Edison has provided means for enabling circuits to work both ways, and, as frequently happens after one way has been shown, still other ways have been devised. With that power of prophecy which comes from the possession of a logical mind and a full knowledge of the state of the art, Mr. Lockwood forecast the restrictions in which the telephone repeater would find itself if it should be practically developed, yet he did not discover himself enabled to prophesy with exactness as to whether a telephone repeater would ever be developed which really would retransmit the spoken word with exactness as to its fundamentals and harmonics, and with an increase in its volume or power.

Thinkers other than Mr. Lockwood have found themselves similarly restricted. Like the problem of line loading, of which its inventor, Dr. Pupin, has said that "it does not lend itself to popular discussion," students of the problem of telephone repeating have been enabled by more or less involved processes to show, on the one hand, that it is merely a problem running counter to the laws of conservation of energy,—or in other words is equivalent to lifting one's self by one's boot straps,—and on the other hand that it is no more impossible than a correct re-transmission of telegraphic signals with equal faithfulness and enhanced power.

The surest answer to any question of possibility versus impossibility, is the performance of the task. Like the gen-

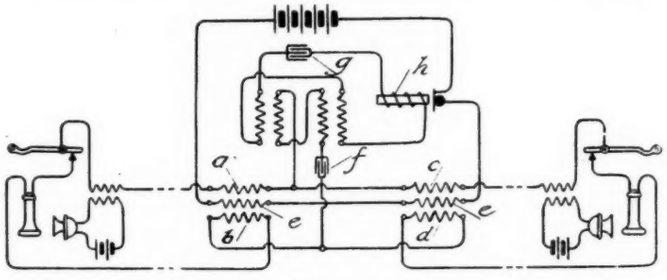


Figure 3.

eral problem of duplex working, or the crossing of the Atlantic by steam power, both of which Mr. Lockwood interestingly recounts were accomplished in almost the moment in which they were proved impossible, discussion as to telephone repeater futility now have been rudely interrupted by the invention of a practical device and its introduction into use. The inventor is Mr. Herbert E. Shreeve, a citizen of Massachusetts, and his invention is covered by two United States patents, Nos. 791,655 and 791,656, issued June 16, last year.

The first patent relates to a telephone current reinforcer or relay involving the principal features shown in Figure 2, and the second circuit with which such a relay is associated, this being shown in Figure 3, and includes two stations, one at either end of a line containing a repeater and its circuit.

Such a repeater and such a circuit have been introduced into long lines over which commercial transmission has been passed without a repeater, but in which the distance-limit of commercial satisfaction was somewhat exceeded. Under proper conditions of adjustment, such a repeater has been found to augment the volume of speech beyond that possible without it, and although the quality of received tones is modified, the transmission of intelligence, broadly considered, is made more effective. By and large, therefore, it may be said that here is *a repeater which repeats*, and which contributes an advantage in so doing. It may be taken as proved, therefore, that with this performance actual, a multitude of repeaters may be expected, each of greater efficiency than this, with the consequent extension of the limits of speech and the probable reduction of the cost of the long distance network. The great thing which this repeater has done is to settle the possibility of the general question.

Specifically considered, the Shreeve repeater consists of a combined receiver and transmitter, of which Figure 2 omits

other than fundamental features. In some degree the device accomplishes the requirement pointed out by Mr. Miller and others, that the inertia of moving parts must be reduced. So far as its receiving features are concerned, Shreeve's repeater copies the receiver invented by Gundlach of Berwyn, Illinois. This receiver, in addition to certain features of the spring-pressed diaphragm with a sensitive inner zone, has as a feature an electromagnet with a fixed iron core extending partly through it, and a movable iron core filling most of the remaining central space. The latter core is attached to the diaphragm at one end and approaches within a very small distance of the fixed core within the coil. Associated with one or both cores in the Gundlach device is a permanent magnet analogous to that of the ordinary telephone receiver.

These features of a coil and a fixed and a movable core are present in the Shreeve device, *a* in Figure 2 being the coil and *b* and *c* being, respectively, the fixed and movable cores. The separation between these cores at *d* is very close, being perhaps three thousandths of an inch, and the continuous magnetism necessary for proper action is gained by means of an auxiliary winding connected with a source of direct current. Presumably no difference in action exists because this magnetism is so produced, but manifestly it is under a more exact control as to quantity than if produced by permanent-magnet means. The line winding in which received voice waves are effective is also in the coil space *a*, being disposed the nearer to the cores.

The movable core *c* attaches directly to the movable electrode of a standard granular carbon button *e*, whose back is supported in the familiar colid fashion. It results, therefore, principally by reason of form and assemblage, that the received voice waves are effective upon the carbon button with a loss somewhat less than in previous designs. In actual construction the button *e* is associated with a heat-radiating device, somewhat after the manner of the air cooled gasoline engine.

Figure 3 shows the relation of the device to its circuit, which consists in the main in a bridge for the receiver and an induction coil for the transmitter. The circuit will be clearest by considering the line proper from one station to the other, as passing clear through the repeating station, encountering as it does so four windings *a*, *b*, *c* and *d*. These, in pairs, *a* with *b* and *c* with *d*, are so related as to be non-inductive for transmitted speech, and thus to hurt the line only in the degree that they insert resistance. But each indicated pair is associated with a third winding, *e* and e^1, which for our study may well be considered a primary, and these are in series merely with each other, a battery, and the carbon button of the repeater.

A bridge upon the line, which can be identified as containing the condenser *f*, also contains the primary of still another induction coil, whose secondary contains a condenser and the receiver *h*. This bridge need not for the sake of repeating contain the condenser *f*, but with it or without it some energy will be passed inductively to the receiver *h*, and thus by action upon the carbon button will be produced in the line itself.

It is notable that whatever energy is passed to the line by the repeater is fed into it serially, so that it is placed upon the sending as well as the receiving end, and this would seem to be a fault which yet requires to be corrected. Similarly, too, that fault would seem to be within the realm of remediable things, so that in that regard as well as others, there is hope for further progress

In observing the performance of the Shreeve assemblage it is interesting to note that like the behavior of a receiver held before the mouthpiece of its own transmitter under good conditions, tones are set up in normal action which tend to persist to the detriment of conversation, and to compare this fact with Mr. Lockwood's statement written almost half of the life of telephony years ago saying that "this reaction often takes the form of a loud musical tone which the receiving diaphragm emits and transmits over both circuits, producing disturbing currents in them and disturbing noises in the telephone receivers which drown out the original sounds."

It is a most interesting experience to carry on a conversation over a line of considerable capacity in which is included a repeater of this type. The experience is the more interesting if the distant speaker be a person with whose voice one is acquainted, for the modification of the originating voice waves can in those circumstances be most clearly observed. Judging roughly by the results in the light of accepted acoustic theory, one is impressed with the feeling that the harmonics are being suppressed or otherwise are being lost, while the fundamentals which produce principal pitches are permitted to survive. This seems a reasonable explanation in view of the probability that the harmonics or "overtones," as they once were called, are serviceable to establish the distinguishing quality by which one voice is known from another, and that it is just such minor vibrations which would be suppressed by the relatively massive action of even so delicate a device as the Shreeve solenoid with its little plunger.

The tendency of the whole organization to sing a little song of its own is apparent in listening to speech received through it. During the continuation of a sentence the musical temperament of the repeater is discernible as imparting a faint extraneous pitch to the speaker's voice, but at the end of a sentence, or at a pause between words, this tendency becomes more noticeable, sometimes existing to an extent which may become annoying.

A LABOR-SAVING SCHEME.

BY C. E. M'CORMICK.

For handling calls on farmers' lines I have found the following method far superior to any other I have heard of. It economizes the time of both operator and subscriber, and so simplifies matters that even a new operator has no difficulty in handling the calls efficiently and promptly.

Briefly stated it is as follows:

Each subscriber on a party line is given a number consisting of three or four figures. The last two figures indicate his signal. Those preceding these last two indicate the number of his line drop.

The basis of the code from which is formed the various combinations of short and long rings is this:

1 means one long ring.
2 means two short rings.
3 means one short and one long ring.
4 means one long and one short ring.

These four things are all that it is necessary for an operator to commit to memory. From them may be formed nineteen different signals as follows: 1, 2, 3, 4, 11, 12, 14, 21, 22, 23, 24, 31, 32, 33, 34, 41, 42, 43, 44. Thirteen is omitted because it is a duplicate of 41; besides it is an unlucky number anyhow.

Under the usual method in small exchanges a call for John Jones requires the operator to spend several minutes in looking up his line and ring. Should a call come in for 1821, the operator, without a moment's hesitation, plugs in Jack 18 and rings two shorts and one long.

Using this system it is not only possible but advisable to have your directory arranged in strict alphabetical order, with a number opposite each name as indicated.

The names of persons served by smaller neighboring exchanges may be included in the regular list, followed by the words "call trunk 21," indicating the line to that particular exchange, which would then handle the call in the usual manner.

Various modifications, made necessary by different conditions, will readily suggest themselves to every practical telephone man.

A PARTY LINE TALK

By P. Kerr Higgins

NOTHING in telephone work has been more fruitful of controversy than party lines. Why should this be? We are all a unit as regards the desirability of having nothing but main lines, but if we have nothing but single lines, how can we ever hope to make our system what it ought to be, namely, that of reaching the maximum number of subscribers possible. With single lines to every subscriber, in the present state of the art at least, we could not afford to reduce the rates sufficiently to reach all of those whom we should reach if we would do our duty to our subscribers. I hold that every family should have a telephone and eventually must have, it is not only necessary to them but also to their friends. Now then the problem is how are we to meet this condition? I know of no other way at present than by the judicious use of party lines, and I believe that this question has come to be a scientific one, in fact, the rate and service questions in telephony are all scientific and should be so considered. No telephone should be installed and no exchange run without a careful estimate having been made of the cost to construct and cost to maintain with fixed charges added. We can then know very nearly what we should charge for service under certain conditions, so that we would not have to change our rate and annoy and lose our patrons as where this has been done under the present "hit and miss" system of fixing rates. We will, therefore, approach this question from the viewpoint of making such service not only desirable from the subscriber's point of view but also from that of the company. In the rural districts we have the farmers and ranchers to consider, and while they do not have occasion to use the telephone much they will use it if the price is reasonable and the service good. We must, therefore, not look at the farmers' line from the viewpoint of the city business man. The farmer is perfectly willing to get slower service and so more lines can be worked per operator. Until the advent of the Independent telephone companies the farmers scarcely knew what a telephone meant, now they are the most enthusiastic users. To-day the Bell company is going after the farmers and working the party line harder than the Independents ever dreamed of and this is the secret of whatever success it is now achieving or may achieve in the future. The Independents started out right but for some reason have let go of the party line feature which was the secret of their earlier successes. The strongest appeal any solicitor can make to a prospective subscriber is the number of subscribers to the system, hence we must reach everyone who wants a telephone, if it is possible to do so. The writer was forcibly reminded of this in a recent trip across the continent finding in isolated places, where one would never expect a telephone, party lines connecting up the various ranches, so that they could be in touch with each other; some of these had connection with towns, villages or cities but a large number had not. The writer recently assisted in the installation of a telephone system in a farming community at Smeltzer, California. The long distance company would not take up the matter nor would others who were approached. They did not think it would pay and at best only ten telephones or so could be put in. What was the result? A mutual company was organized among the farmers and a fine exchange system of nearly two hundred telephones is now in service at rates averaging $1.25 per month and I am told is a financial success. These farmers, strange to say, had no previous knowledge of the telephone business and at the beginning were very reluctant to go into it. This is only a sample of what may be done. I met a farmer the other day who lived about fourteen miles from Los Angeles, got to talking telephone and he said he had persistently refused to take a telephone, he felt that he could not afford a main line and he would not have a party line as he considered that the twenty-four dollars a year would be wasted; a week ago he visited the city and found that potatoes were selling at one dollar and a quarter a sack. He went home but could not load up next day but did so the day following, taking with him a large load as this he considered a good price, on arriving in the city he found that the price had fallen to one dollar, the best he could do; he thus lost more on his one visit to the city than the price of a telephone for a whole year, he then told me he at once placed an order for a telephone even if it was a party line. This is a fair sample of the typical rancher, he looks upon the telephone as a luxury and does not want it unless you can show him that it is a straight business proposition and places him in instant touch with the markets. Party lines should, as a rule, be confined to the very small business houses, the ranches or farms and the residences; in this way a very large saving is possible in the length of the circuits, line expense, and so it is possible to give lower rates; by adding selective equipment or lock out apparatus the substation cost is increased about fifty per cent but even so a better rate can be established than when a main line is used. The cost of maintaining a party line is greater than a main line, but is divided up among the number of substations and the difference is then very small. The operating expense is about the same. The party line introduces the mutual or co-operative feature and makes the use of the telephone possible in districts and communities where otherwise it could not exist. Party lines should be treated with the same care and consideration as main lines, as a matter of fact they earn more but are neglected and ignored by the average telephone man as cheap service; there is absolutely no sane reason for this, any more than if we were to neglect the small consumer or purchaser in any business, a thing which would not be tolerated in a business house where any respect or consideration for its patronage was considered; hence I wish to emphasize the importance of caring for and maintaining and operating the party lines just as you would a main line if from no other than a mercenary motive, that of gain. Party lines exist under various forms: (1) Straight away line. (2) Selective (Polarity). (3) Selective (Frequency). (4) Selective and Lock out. (5) Step by step selective. The straight away is popular with the average exchange because of its simplicity and cheapness; and consists of instruments with ordinary ringers, responding to as alternate current such as supplied by a magneto or generator. Such a line may be either series or bridged. In the series system, as is well known, all the telephones are in series with each other; in the bridging they are all bridged across the line. The difference between them being in the resistance of the ringers; in the series type are short spools wound to 80 ohms and in the bridging long spools wound from 1,000 to 1,600 ohms. In such a system all the bells ring when any one telephone is rung upon the line. In order to distinguish them a number of rings are assigned—one, two or three up to five, when a system of long and short rings is introduced; for some reason the farmers do not object to this as much as might be expected, for the reason frequently given that they like

to know what is going on. The city people are just the opposite and oppose it every time. Because of the amount of eavesdropping which takes place on the average farmers' line it has been found necessary to introduce resistance or capacity to keep down the loss due to this cause. This resistance (non inductive) having no core, or a condenser is placed in the secondary of the induction coil in series with the receiver. The condenser is found in practice to give the best results and permits the exchange, or calling party, to signal the party wanted even if a number have their receivers off the hook. Numbers of such a party line are entered in the directory as two rings on twenty-one or 2R 2I or — —— 2I in the case of a short and long ring. This method can be used on almost any telephone system. If a single grounded line it cannot be changed under this head but may be worked differently under the others; if a metallic line (two wires) then we may split one line in two for signaling and ring five on each side to ground, the talking being done metallic. Under the second division we come to consider the selective system known as the polarity method. This system is operated by dividing up the alternating current into its two component parts, positive and negative, and so arranging the ringers by clapping that they respond to a positive or negative current as per the arrangement of their connections, this is done by winding the ringer coils in opposite directions and holding the armature against one side by means of a flat copper or brass spring between the armature and pole piece or a spiral spring fastened to the armature. These are often termed biased ringers when so arranged as to respond to only one position of an alternating current. In such a system when the pulsating current is sent out on the line in one direction it assists the action of the biased spring and attracts the armature more strongly, hence no movement of the hammer is perceptible if the adjustment is correct, if a loose adjustment is permitted then the bell may tap slightly; the adjustment should be such that the hammer rests lightly against one gong. If the direction of the pulsating current be now reversed, each wave pulsation will pull against the spring, attract the armature and pull over the hammer, causing it to strike the other gong between the pulsations, the tension of the spring will pull the armature back to normal and so the gongs are alternately struck as in alternating current ringing. By a proper distribution of the positive and negative instrument connections and suitable apparatus at central office a good and reliable selective system is possible. The central office arrangement may consist of a five position key or two two position keys and button. Position one alternating, position two positive to tip of plug, position three negative to tip, position four positive to sleeve, position five negative to sleeve; butttons may be used and the tip and sleeve of the line changed my means of an ordinary listening key. The buttons when used may be numbered or of different colors and should on being depressed lock so as to indicate to the operator the proper ring, without asking the subscriber again, in the event of party not answering on first signal. In central energy systems, in order to avoid loss of current due to leakage through the ringers, high wound ringers of 5,000 ohms (2,500 each) are used or all four of the stations may be connected on one side and the relay system used with condensers. It may here be noted that a pulsating current on passing through a condenser becomes alternating hence, a combination of direct and alternating current is necessary on the relay system. In such a system a direct current is sent out on one side of the line which cuts in the ringer, alternating current being sent out on the other side operates the bells. The two frequency system has given very good results. It is somewhat similar to the polarity system already considered except that two frequencies are used with special arrangements of condenser and retardation at the sub-station, two bells may be bridged on both sides of the line. Two frequencies are used, 1,200 cycles and 3,600 cycles per minute. In the 1,200 cycle telephones is a retardation coil having an ohmic resistance of 2,000 ohms in series with the ringer and two micro-farad condenser to ground. In the 3,600 cycle sub-station set the same equipment exists but having a different arrangement, the 1,000 ohm ringer is in multiple with the coil, one end of the coil and one end of the ringer being grounded, the whole being connected to the line by means of a three-tenths micro-farad condenser. These can be wired to terminals so that any instrument can be quickly converted into a low or high frequency station, one instrument of each kind connected to each side of the line. The principle governing this system is that the resistance of a retardation coil to the flow of an alternating current increases as the frequency or number of cycles is increased; and the impedance of the condenser increases as the frequency is decreased, so that when the high frequency is used it passes through the low capacity and rings the bell; when the low frequency is used the entire current passes through the two micro-farad retardation and bell (in series) in preference to the multiple arrangement of the other bell. The arrangement at central is virtually the same as in the other, except that a machine (or generator) has to be provided with two frequencies, these may be separate or combined in one machine. The low frequency has two poles, the armature having a speed of 1,200 revolutions per minute; and the high frequency two poles and 3,600 revolutions per minute of four poles at 1,200 revolutions per minute. If on one machine there should be a two and a six pole running at 1,200 revolutions per minute. Another four party line along somewhat similar lines, which dispenses with ground connections makes use of one gong instead of two; this is a bridging system, all four stations on one side of the line, the armatures are of different weights as also the strikers. In this system four frequencies are used being equal to 1,000, 2,000, 3,000 and 4,000 cycles per minute, the strikers being adjusted in various lengths the longest to the lowest frequency and the shortest to the highest frequency. At central special generators are provided of two, four, six and eight poles, all arranged on one shaft driven by a motor. A regulator is provided to cut resistance in and out of the field, with this coil cut in the speed is 1,100 revolutions per minute and cut out 900, it is very constant even with a variation of twenty-five per cent in pressure. Of late an eight party selective, four on each side, has been made possible on this same principle. In order to supply current of the proper frequency to the line the keyboard is arranged with four or eight party ringing buttons in connection with the cord circuits. Another system is that devised to work on a well-known system in which the cut of relays are permanently connected to ground on the sleeve side of the line; this is a two party line arrangement, one on each side of the line to ground, having a condenser in series with the ringer, using the pulsating and alternating current method of signaling, battery being used to hold the relay while signaling. When signaling on the tip, alternating current is used with twenty-four volt battery on sleeve; when signaling on sleeve then the negative current is used, which while still holding the relay passes out to the line and in passing through the two micro-farad condenser becomes alternating in character and rings the bell. Another form of party line is the step by step method on which telephone men have been working constantly with varying suceess until recently when quite a few have come to the front showing good results. In this method, by certain movements on the part of the operator, it is possible to pick out a particular station and ring its bell to the exclusion of all others. This method had its beginning about 1879, the invention of E. N. Dickerson. It was purely and simply a battery selector with a toothed wheel at each instrument suitable, arranged so that after a given number of pulsations was received a flat on the wheel permitted a lever to fall into place and introduce the call bell; this same principle forms the basis of all step by step

forms, the difference being in arrangement and mechanism. In combination with the step by step selection a lock out system is also possible, so that when any one is using the line all the other stations on the line are locked out.

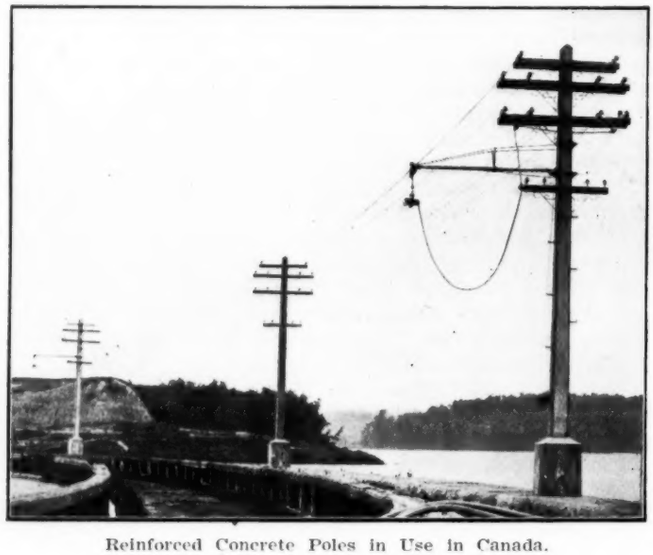
Such a line should fulfill the following conditions: (1) Selective, both in calling central and in being called. (2) Able to communicate with another party on the same line by calling central. (3) Indicator showing line busy. (4) If line is kept busy too long it should be possible for party to signal central, but not cut in on the conversation going on between parties. Such a system is worked on the automatic principle, that is the sending of a given number of impulses out on the line which causes a magnet to be energized which in turn rotates a wheel, one movement for each pulsation, when the movement is complete and the station selected the springs are in the signaling and talking position so that the operator on ringing out on the line metallic with alternating current will ring the bell. Great care must be exercised by the operator on such a system to give the correct number of pulsations, otherwise a wrong number will be rung. All the wheels move with each pulsation but the dead point or signaling point in each is different, being at one for number one and at two for number two and so on, hence if five impulses are sent, instrument five is at signal with ringer cut in to receive signal while all the others are off signal with ringers cut out. The normal condition is restored at the end of a conversation by the operator sending out current on the line, this current being in an opposite direction to that used for calling subscribers. In some systems it may be done by sending out alternating to ground on one side of the line. The wheels at the substations are controlled by a strong spiral spring so that when the pawls are released the wheels fly back to normal. By bridging the generators on the line, with automatic cut out of armature, it is possible to signal central and repeated signals during a lengthy conversation should receive the attention of the operator. Another party line apparatus is called the "Harmonic system." It is a deviation from the beaten path of polarized systems and is meeting with success.

REINFORCED CONCRETE POLES

An Interesting Description Published Through Courtesy of the Canadian Electrical News

THE various electric transmission companies which have been organized within the past few years to transfer the energies of Canada's large and numerous water powers for hundreds of miles from the power producing plants have been, and are yet, in a state of uncertainty as to what style of support is best adapted for these long lines.

The cedar poles, which formerly could be procured at a small price, and of almost any dimensions, are becoming difficult to obtain. In addition to this the cedar poles require to be set very closely together, as their strength is not sufficient to carry the heavy wires used unless short spans are adopted. The adoption of short spans means large numbers of cross-arms and insulators, which would not be required on longer spans, and as the insulators are the weak points in long distance transmission, where continuity of service is absolutely necessary, it is very important that the number should be limited to the fewest possible.



Reinforced Concrete Poles in Use in Canada.

When the spans are increased in length, it becomes necessary to use stronger poles, and various styles of steel structures have been designed for the purpose and spans as long as 400 feet erected upon them. Steel poles have the disadvantage of being costly and require considerable expense in maintenance. Wide base towers which have been used instead of poles on account of cheapness have the further disadvantage of taking up considerable width of right of way, and being necessarily built of light material, will not have the same length of life.

Mr. J. L. Weller, superintending engineer of the Welland Canal, conceived the idea of a reinforced concrete pole to take the place of cedar and steel. The idea seemed so preposterous, however, that it was over two years after its first conception that the first pole was made. This was a failure on account of faulty reinforcement, and it was not until the third or fourth trial that a substantial pole was made, nearly two years ago. This pole when tested was so satisfactory that others were immediately built, and to-day there are nearly one hundred poles erected on the Welland Canal electrical transmission line. Some of these are shown in the accompanying illustrations. All the cedar poles for the line and two hundred steel poles thirty-five feet in height had already been contracted for by that time, consequently the concrete poles were used only in positions such as railway and road crossings where an extra high pole was required.

The poles are manufactured on the ground with their butts immediately over the hole in which they are to be erected, as it has been found very expensive to transport them on account of their great weight; a thirty-five-foot pole for ordinary line work weighing about two and one-half tons, and a fifty-foot one about five tons.

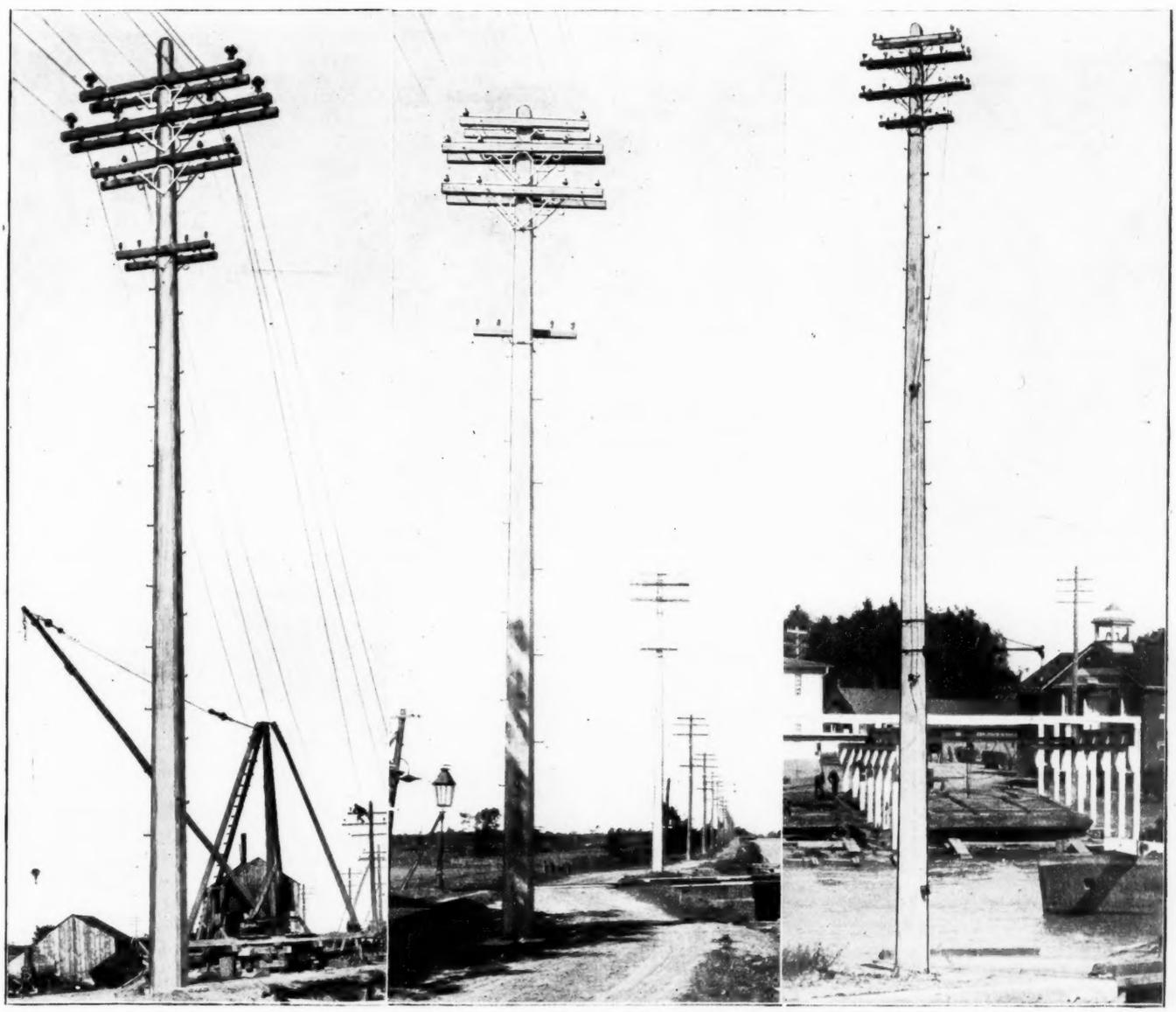
Most of the poles so far made have been calculated to stand a horizontal pull at the top of 2,000 pounds, and tests that have been made show that the calculations have been correct, all standing the full load without any impairment, except one, which failed at 2,025 pounds, the cause being a flaw in the weld on one of the steel rods.

All poles have been made square, with the corners champered off, on account of ease in making and also on account of the saving in steel over any other section, each rod doing double duty, that is to say, if a pole is strained in one direction, rods *A* and *B* take up the tension, and if strained at right angles to the first direction rods *B* and *C* take up the strain, rod B thus acting twice. The steel rein-

forcement is figured on the fact that the stress in a pole from a horizontal pull at the top gradually increase from the top downwards, the leverage increasing directly with the distance from the point of pull. The theoretical reinforcement would, therefore, be a rod tapering from nothing at the top to a certain diameter, depending on the strain, at the bottom. As these tapering rods are not rolled at present, the same effect is obtained as nearly as possible by welding different sized rods together, the diameter increasing by an eighth of an inch about every ten feet. Several trials were made to overcome the necessity of welding the rods, but hook joints or lapping the bars over each other at the junction gave very poor results, and all rods are now welded into one rod the full length of the pole.

The poles are moulded in wooden forms, in a horizontal position, the top side being left open and finished with a trowel. Foot steps are imbedded in the soft concrete as the pole is being made and bolts for cross-arms also, or holes are left so that a bolt may afterwards be put right through the pole. The concrete is composed of a 1:2:4 mixture, using the best portland cement and clean sand and finely broken stone. Gravel has been used with success, in fact most of the poles so far have been built with gravel instead of broken stone.

Concrete poles are quite elastic, and they do not require painting, being of a pleasing gray color, which, of course, will last indefinitely. They should last forever, as the weather is claimed to have no effect whatever on them. As there is some question about this latter assertion, attention may be drawn to a good granolithic sidewalk, which, if properly built, shows no signs whatever of age after 25 years, and a sidewalk during the spring, fall and winter is under much more serious stress of weather than a pole could possibly be. Therefore, there seems to be no reason why the concrete pole may not be the pole of the future. They can be built of any desired height or strength.



Reinforced Concrete Poles Do Not Require Guying.

Arrangements are now being concluded for the building and erection of two poles 150 feet in height at St. Catharines to carry wires over the old Welland canal for the Lincoln Electric Light and Power Company.

The erection of the poles, especially such large ones as those mentioned above, which weigh about fifty tons each, is quite a serious matter, but they are being put up with very little trouble now, although at first several were broken through defective tackle.

The cost of these poles will depend on local conditions somewhat, and upon the specifications, as different users have different ideas as to the strength a pole should have

for line work. As a general rule, however, the cost may be taken as about twenty-five per cent less than that of a steel pole of similar strength.

To make these poles completely fire and time proof, concrete cross-arms would be a step forward, and these are now being experimented with.

In cities where wooden trolley poles are not allowed, reinforced concrete poles should soon replace other forms, as they present a better appearance, are cheaper than steel, and will not rust off at the ground line as steel poles do.

Mr. Weller has patents granted or applied for in nearly every country in the world, including the United States. He has disposed of his Canadian patent to the Concrete Pole Company, Limited, of St. Catharines, Ont.

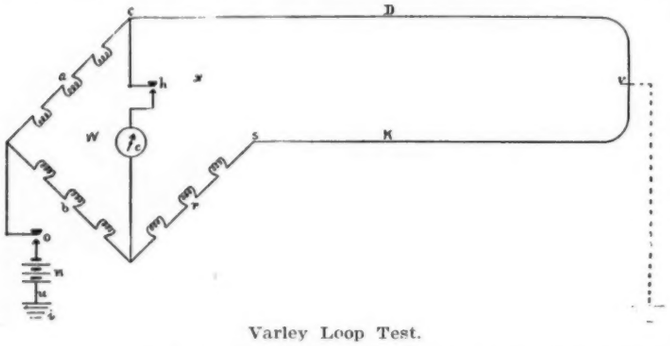
MODERN TELEPHONY IN THEORY AND PRACTICE

Localization and Remedy of Telephone Line Troubles.

By W. H. Radcliffe

AN INSPECTION of telephone line wires may reveal any one of the following defects: a wire of one circuit across that of another circuit; a line wire connected either directly or indirectly with the earth; a broken line wire; of a swinging line wire causing intermittent trouble by alternately opening and closing a circuit. Of these, the last defect is by far the most difficult to locate on account of the short intervals of time in which testing must be done to give any information concerning it.

In order to locate the troubles previously mentioned, two methods are available. The one method consists in going over the entire line and carefully examining its general appearance; the other method consists in testing, by means of a Wheatstone bridge and galvanometer, the ohmic resistance and the insulation resistance of the line wires. The



Varley Loop Test.

former method is so slow as to render it impracticable on long lines, and in any case it is more or less ineffectual, so that the second method is the one generally employed for locating defects not only on open wire lines, but also on cable lines.

In a telephone cable line, trouble may be expected from poorly made joints through which moisture enters and reduces the insulation resistance of the line; a damaged sheath produces the same result, and this also frequently indicates a short circuit between the conductors. In overhead cable lines, lightning or stray bullets are often responsible for damaged sheaths, while in underground cable lines electrolytic action caused by leaking trolley currents is frequently the cause. In the latter case an effectual grounding of the telephone cable sheath with the railway return circuit will prevent further trouble from this source, and on overhead lines air-space arresters may be placed at the exchange end of the cable as a further protection against lightning to that afforded by the carbon plate arresters.

For locating grounded, crossed, or swinging conductors on open wire or cable lines, the Varley loop test forms one of the most accurate and convenient methods. The connections for this test are shown in the illustration, in which a Wheatstone bridge *W* and a D'Arsonval reflecting galvanometer *c* (provided with lamp, stand, scale, and shunt) are connected with a battery *n* grounded at *i*, the defective wire *K*, and a perfect wire *D*, the last two being joined together on the line. The point *v* represents the location of the trouble, which in this case is a leak to ground *m*. On the bridge, *a* and *b* represent the ratio arms, *r* the adjustable resistance, and the circuit *s v e* consisting of the defective wire *K* and the perfect wire *D* forms the total resistance *x*. The value of *x* being known, 100 ohms is unplugged in each of the ratio arms *a* and *b*, and by varying the adjustable resistance *r* the four arms of the bridge are balanced. When this occurs there will, of course, be no deflection in the galvanometer *c* upon depressing both keys *o* and *h*, and the resistance of the wire length *s v* then equals $\frac{x-r}{2}$ Dividing the resistance thus obtained by the resistance per unit length of the defective wire, will give the approximate distance along this wire to the trouble. In order to obtain more accurate results the ratio of *a* to *b* should be made 100 to 1,000; in this case, the resistance of the wire length *s v* equals

$$\frac{x\,a - r\,b}{a + b}$$

When using the Varley loop method to locate crossed or swinging conductors, one of the defective wires must be grounded, while the other in connection with a perfect wire should be used for the resistance *x* as in the previous test. If, however, the crossed conductors give indications of a good contact with each other, the location of the trouble may be ascertained by simply measuring the resistance of the circuit formed by the crossed wires and dividing by twice their resistance per unit length. In this last method the Wheatstone bridge is used in the regular way, the free terminals of the crossed wires being connected to the bridge at *e* and *s* respectively, and the wire *u* from battery *n* instead of running to the earth *i* being connected to the bridge at *s*. The resistance of the crossed wires is then the unknown quantity *x*, which when the arms of the bridge are balanced, equals the ratio of the resistances *a* to *b* multiplied by the resistance *r*.

In the following table are given the resistances to introduce in the *a* and *b* arms of the bridge for measuring different values in the *x*-arm. The figures given are for a Wheatstone bridge having a total variable resistance of 1,110 ohms. If the rheostat arm has ten times this capacity, then values of *x* ten times greater than those recorded in the table can

be measured without changing the resistances given for the ratio arms:

Approximate value of x.	Resistance in a-arm.	Resistance in b-arm.
10 ohms or less.	1,000 ohms.	10 ohms.
110 ohms or less.	1,000 ohms.	100 ohms.
1,100 ohms or less.	1,000 ohms.	1,000 ohms.
11,000 ohms or less.	100 ohms.	1,000 ohms.
111,000 ohms or less.	10 ohms.	1,000 ohms.

Tests for insulation resistance between the conductors of a telephone circuit, between the conductors and the ground, or between the conductors and the lead sheath of the cable, often aid in locating trouble. In making tests of this nature a Wheatstone bridge having a rheostat capacity of 1,110 ohms may be used in the regular way up to 111,000 ohms, and one having a rheostat capacity of 11,110 ohms may be used in the regular way up to 1,111,000 ohms. Insulation resistances exceeding the latter value should be measured by the equal deflection method. This method consists in comparing the galvanometer deflection caused by passing a current through a known resistance, with that caused by passing the same current through the insulation to be measured. The insulation resistance is then equal to the value of the known resistance multiplied by the ratio of the former deflection to the latter deflection. The insulation resistance per mile may then be calculated by multiplying the value of the insulation resistance previously obtained, by the ratio of the length in feet of the part tested to 5,280.

In making tests for insulation resistance, one of the lead wires is connected to the conductor in question and the other lead wire to the ground, sheath, or wire, as the case may be; there should be no other connection between the parts tested, and it is advisable to allow the testing current to saturate the parts about 1 minute before taking a measurement. In the equal deflection method a battery giving between 50 and 100 volts is required, and a galvanometer shunt is employed to vary the sensibility of the instrument; the D'Arsonval galvanometer may be used, and the value of the known resistance should be approximately equal to that of the insulation resistance to be measured.

Owing to static charges accumulating between the conductors, or between the conductors and sheaths of telephone cables, capacity tests are sometimes necessary. These tests are made by comparing the deflection produced in a galvanometer when discharging the parts thus affected through the instrument, to the deflection produced in a like manner by a condenser of known capacity. If the charge in each case is given by the same battery and be of about 1 minute's duration, then the unknown capacity is equal to the ratio of the latter deflection to the former deflection multiplied by the known capacity. The capacity per mile may then be calculated by multiplying the number of microfarads obtained from the measurement, by the ratio of 5,280 to the length in feet of the part tested. The known capacity used in the test is a standard condenser of usually ½ microfarad capacity.

In the early stages of telephone line construction, and in fact at the present time in many exchanges, the earth is used as one conducter for each telephone circuit. Owing to the many electric light and railway lines now traversing our land, it is almost impossible to select a locality where these grounded systems afford satisfaction on account of the inductive disturbances caused by stray earth currents. The only remedy for such a trouble consists in changing the system to one of complete metallic circuits. Of these, the common return system is a compromise between the grounded system and those requiring two wires for each telephone, being more expensive and less troublesome than the former system, but less expensive and more troublesome than the latter. In the common return system, one conductor somewhat larger in section than that of the usual line wire, serves as a common conductor for a number of lines. If the inductive disturbances occurring in this system become very troublesome they may result in a measure from too small a return conductor, or one composed of iron or steel instead of copper; from a fuse, or from a loose or grounded connection in the return wire; from magnetos and line drops of too low resistance, or from a low insulation resistance of the line. An electric lighting circuit running parallel to the telephone conductors will cause trouble in this system, and also in the system using two wires for each telephone unless transpositions be made frequently on the line.

It often occurs in telephone line construction, that a complete metallic system must be connected with a grounded system; as, for example, a toll line with a local exchange. The direct connection of such circuits almost invariably produces trouble in the way of cross talk, and the remedy consists in connecting them inductively by means of a repeating coil. The two terminals of one side of the repeating coil are connected respectively with the two wires of the complete metallic system, and the two terminals of the other side of the repeating coil are connected with the grounded system, and the one terminal with the line wire and the other with the ground. While a repeating coil is similar in construction to that of an induction coil or a transformer, it is not intended either to raise or lower the electromotive forces of the circuits to which it is connected, but simply to repeat the electric impulses of the one system into the other system; both sides of the repeating coil are therefore wound with the same number of turns and to the same resistance.

SPEECH REPORTING BY TELEVANT.

At the office of the Grand Rapids (Mich.) Herald recently reporters were enabled to take down in full the speech of Secretary of War Taft, who spoke before the Chamber of Commerce at Detroit, 195 miles away. This was made possible by the use of the "televant." Two transmitters were placed within fifteen feet of the speaker's table in Detroit, and the words of the speaker were far more clear in Grand Rapids, it is said, than to listeners at the farther tables in the hall where they were actually delivered. Before the speech of Secretary Taft the reporters listend to the entire program of the Temple Theater in Detroit, hearing the music perfectly.

The "televant" is a supersensitive telephone transmitter. The idea of using it for the transmission of speeches, music and other sounds over a long distance is ascribed to James F. Land of Detroit. The transmitter is smaller than the one in commercial use. It lies pointing toward the ceiling and responds to sound vibrations from any part of the room, although it is generally placed near the speaker. At the banquet of the Chamber of Commerce in Detroit, the transmitters, two in number, were hidden in a bower of foliage, about fifteen feet in front of the speakers. The receivers in Grand Rapids did not differ from the ordinary type.

With an instrument capable of reproducing the vibrations of the human voice, difficulty is experienced, it is said, in reproducing music. The great difference in the volume of sound makes it necessary to have two transmitters, one for music and one for the voice. These are used as necessary and are switched on or off by an attendant at the central office. The telephonic impulses from Detroit were carried to Grand Rapids over a trunk line of Number 8 copper wire, weighing 340 pounds to the mile.

Many people have wondered how it was that the Japanese generals were able to keep in telephone communication with their soldiers along the entire battle line. The explanation is simple when it is known that the Japs strung their wires to the captured Russian Poles.

DECISIONS AFFECTING TELEPHONY

By Gilbert W. Hand

MEANING OF "DISPATCH"—PENALTY FOR FAILURE TO DELIVER —DISCRIMINATION.

SECTION 1,255 of the Revised Statutes of Missouri, of 1899, provides as follows: "It shall be the duty of every telegraph or telephone company, or any one operating any telegraph or telephone line in this state, to provide sufficient facility in all its offices for the dispatch of business for the public, and to receive dispatches for and from other telegraph or telephone companies, for and from any individual, on the payment or tender of their usual charge in transmitting dispatches as established by the rules and regulations of such telegraph or telephone lines, and to transmit same promptly, impartially and in good faith, under a penalty of two hundred dollars." The statute also provides, for the recovery of the penalty in a civil action for failure to send a dispatch as provided by law. June 10, 1904, one D. E. Pollard, desired to communicate with one Pratt, in Kansas City. The former lived at Braymer, and offered the defendant's agent at Braymer, payment of toll, but for some reason Pollard was refused connection. He afterwards brought suit against the Missouri and Kansas Telephone Company, who owned the lines between the two towns. The defendant won in the Circuit Court of Calvil county, and Pollard appealed to the Kansas City Court of Appeals. It will be observed that the statute expressly provides a penalty for failure "to receive dispatches from and for other telegraph and telephone lines, and for and from any individual, in payment of the usual charge, etc." Pollard had requested that he be placed in connection with the Kansas City party, that he might converse with him. Pollard, however, did not present a dispatch to the defendant's agent, at the city of Braymer, to have same communicated to Kansas City. The court stated, "manifestly he desired to communicate by conversation directly with Pratt, this was denied him, and in such wrongful denial, he might have his action for damages, but this statute should not receive strained construction. The duty imposed upon the defendant to provide facilities to the officers for the conduct of business with the public, to receive dispatches for and from other telephone lines, for and from any individual must, when such dispatch is received be transmitted promptly." Plainly the defendant had not violated any provision of the statute.

The court further says the meaning of "dispatch" in the statute is as follows: "It is doubtless the duty of a telephone company to receive at the office, a dispatch properly addressed and paid for and to transmit such dispatch by the voice over its lines, to the addressee, but the statute means a written dispatch to be delivered by the sender to the agent of the company. This can be clearly seen by the provision immediately following section 1,255. By section 1,257 it is made the duty of the company's agent when the line is out of order to inform the sender if requested to write that information on the dispatch. Provision is made in section 1,258 against forging dispatches, so, also by section 1,259, a written dispatch is meant." The court affirmed the judgment in favor of the company, stating that it was not liable to Pollard, for any violation of the statute.

Pollard v. Missouri & Kansas Telephone Company, 90 S. W. 121.

RIGHT TO CONSTRUCT POLES AND WIRES "OVER AND ALONG" PREMISES DOES NOT MEAN "ACROSS" THEM.

The American Telephone & Telegraph Company secured from one Zimmerman a receipt in consideration of the sum of one hundred dollars whereby authority was given the company to "construct, operate and maintain its lines over and along the property . . . including necessary poles along the roads." Under this authority the above company strung its wires diagonally across the lot of Zimmerman and had maintained same in this way for some time. Finally the latter began suit against the company, charging that it had no authority to string wires across the lot and claiming damages as a consequence of the alleged unlawful occupancy. The question turned on the meaning of "over and along" the plaintiff's property. The court held that this authority to place wires "over and along" did not mean that defendant should be permitted to string its wires at any place other than along the sides of the lot; that there was no authority under this grant to string wires across the property.

Zimmerman v. American Telephone & Telegraph Company, 51 S. E. 243.

EMINENT DOMAIN IN NORTH CAROLINA COMPANIES MUST COMPENSATE ABUTTING OWNERS.

An exhaustive discussion of the right of abutting owners in the above state to compel payment for damages occasioned by the placing of poles or the cutting of trees in front of their property has been made by Justice Connor, of the Supreme Court, in the case of Brown v. Asheville Electric Light Company. The facts in the case were as follows: Defendant had secured the right from the board of aldermen of the city of Asheville to erect its poles and wires along the public streets of the city. Under the authority stated the company proceeded to and did cut down a certain tree belonging to one Brown. The tree in question was outside the sidewalk and it was found that to cut it was in line with the convenience of the defendant rather than a matter of absolute necessity. Brown sued for damages and the jury found that the depreciation to his property as a consequence of the destruction of the tree was $499. The company put forth the defense that it had authority to cut down any tree or trees in order that it might the better carry out its public function, that it mattered not whether it was a question of absolute necessity so long as defendant wished to cut the tree. Defendant insisted that it stood in the place of the municipality, which under the power of eminent domain had condemned the street in question. The court took the opposite view, relying principally on the noted Eels case, decided by the New York courts some time ago, 38 N. E. 202, which has been frequently referred to in TELEPHONY. The following statement from the decision disposing of the case will be sufficient to make plain the theory on which the court held the defendant without authority to remove the tree before first making provision to compensate the owner: "We have no hesitation in holding that assuming that, the board of aldermen of the city of Asheville had met and formally granted to the defendants the right to remove the tree, finding that its removal was necessary to put up its poles and wires either for the electric light or street railway upon and along the sidewalk, such action would not have justified the defendants in the act of removing the tree. It was not within the power of the city to deprive the plaintiff of his property for such purpose without compensation. It is suggested that it was more convenient to place the pole with the tree out of the way. This falls far short of the essential condition upon which private property may be taken, or burdens placed upon it. . . . We are impressed

with the wisdom of Judge Beckham in concluding his opinion in the Eels case. Referring to the argument that cases of this character should be decided with reference to the wants of an advancing civilization, which is doing so much to render life more comfortable and attractive, he says, 'let the defendants pay the owners for the value of the use it makes of the land outside and beyond the public easement in the highway, and the necessity for the broader decision is done away with.' It has the power to take the land upon making proper compensation, and hence the refusal of the owner will not stop the proposed undertaking." It will be noticed that this decision makes no attempt to discriminate between city and rural streets. Many courts have outlined this distinction, holding that the owner must be compensated in rural highways and not if he be a city dweller. The case is authority, however, for the broad proposition that in this state owners must be compensated by companies erecting poles in front of private property, also for damages for the removal of trees in front of such owners' premises.

Brown v. Asheville Electric Light Company, 51 S. E. 62.

LICENSE TO TRIM TREES IN NEW YORK—PAYMENT OF FIVE DOLLARS FOR SUCH RIGHT AND EXTENT OF AUTHORITY UNDER THIS EASEMENT.

The Hudson River Telephone Company recently found it necessary to obtain permission of one Barber to cut certain limbs off trees belonging to him and entered into an arrangement whereby he signed a receipt as follows: "Received of Hudson River Telephone Company Five Dollars for right to erect their telephone line along the highway in front of my premises (describing same), and for the right to maintain the same, with necessary poles, wires and guys, and to trim trees so that they shall not come in contact with the wires." The New York courts held that this was a sufficient authority to warrant the company in proceeding. It was also held that under such an authority the easement was continuous and unlimited as to time, and contemplated the right to string as many wires as the company should find necessary. It was also said that the company would be liable as a trespasser for any cutting beyond what was reasonably necessary for the protection of its wires.

Barber v. Hudson River Telephone Company, 93 N. Y. S. 993.

CONSTITUTIONAL PROVISION FOR TAXATION ON GROSS EARNINGS OF ALL TELEPHONE COMPANIES.

The State of Minnesota has provided by a constitutional amendment that the Legislature may impose on telephone companies a tax of three per cent on their gross earnings in lieu of all other taxes and assessments of whatever kind or nature upon all property held, owned or used by them in and about the construction, repair, or operation of their business. A certain lot of the Northwestern Telephone Company was assessed in addition to the gross earnings, tax and payment being refused suit for the recovery was commenced by the state. The supreme court said in deciding the case that the provision of the constitution that such companies pay a gross earnings tax relieved them of the payment of all taxes on their properties actually necessary in their business, but that such companies were liable to pay taxes assessed in the ordinary way on all properties not actually in use. The court held that the defendant in question was liable for the payment of ordinary taxes on the lot.

In the argument of the case it was urged by the attorneys for the state that the constitutional provision was only to relieve telephone companies of the payment of ordinary taxes on their franchises and personal property and that all real estate should pay the ordinary taxes. The supreme court refused to consider this question, saying that so important a proposition should not be decided without the fullest consideration and in a case putting the point directly before the court.

State v. Northwestern Telephone Exchange Company, 104 N. W. 1086.

LAWYER REMAINS AT OFFICE AND ARGUES A MOTION OVER TELEPHONE.

A novel use of the telephone has been indulged in by a Salem, Ohio, lawyer, who, being too busy with matters in his office, arranged to argue a motion for new trial with the state's attorney over the telephone. The client was a rural resident, and the justice of the peace being willing to proceed in the above manner, the Salem lawyer argued his motion. While this incident emphasizes the common statement that the telephone has eliminated distance, the writer is unable to understand how the justice could consider his legal friend in court unless it be assumed that this court was of very far reaching jurisdiction.

LICENSE TO PLACE WIRES ON BUILDINGS IS TERMINATED BY THE TRANSFER OF THE PROPERTY.

The litigation in Brooklyn, New York, between the New York Telephone Company and certain residents of the city to recover damages for the stringing of wires across private buildings has been decided by the appellate division of the supreme court. The proposition of law that companies must pay a rental for such privilege is too elementary to be emphasized, but the decision notes a principle of more or less importance, namely, that a license to string wires is a revocable license and is terminated by a transfer of the property to another. Justice Laughlin wrote the opinion in which he stated, "the defendant, the New York Telephone Company, has no right to invade private premises to attach its wires to the roof or chimneys without a license from the owners, and it has no right to maintain them after a change in ownership, without further license."

AUTHORITY OF PROBATE COURTS IN MATTER OF REGULATION OF TELEPHONE COMPANIES IN OHIO.

The well-known case of the Queen City Telephone Company against the city of Cincinnati brought on originally as a result of a failure by the municipality to admit the above company to an occupancy of the streets of the city has finally reached and been decided by the supreme court of the state, and in the decision some important conclusions were reached relative to the authority of the probate courts of the state to act in determining the right of telephone companies to use the streets of municipalities when the common council has refused to grant the permission. The decision is adverse to the right of the probate courts of the state to fix the conditions under which telephone companies may use streets.

The Queen City company first applied to the common council of the above city for the right to use and requested it to determine the conditions precedent to an occupancy of the streets of Cincinnati with its poles and wires or conduits. The council absolutely refused to grant the right of occupancy to the telephone company. A statute of the state makes provision that "where lands sought to be appropriated to the use of a company are subject to the easement of a street, the mode of use shall be such as shall be agreed upon between the municipal authorities and the company, and if they cannot agree, then the probate court shall direct in what manner the line shall be constructed along such street, so as not to incommode the public in the use of the street." Relying on the authority of this statute the telephone company applied to the probate court, where it was successful in getting a favorable consideration of its appli-

cation. Successive appeals were taken, and as before stated the supreme court has finally disposed of the case. The following quotation from the decision needs no comment: "It is of course conceded as now well settled that the general power to occupy the streets of a municipality by a telephone company is derived from the state (Zanesville v. Telephone Company, 59 S. E. 781). The case of Farmer v. Telephone Company, 74 S. E. 1078, is also authority for this proposition. (Referring to this last case, it may not be amiss to remark that on page 532 of 72 Ohio St. . . . the type makes the writer say that the probate court is a substitute in all respects for the municipal authorities. This was not intended. The words 'as to rates' which should precede the above statement have dropped out. Without them the statement is too broad.) But taking the sections of the statute as a whole and considering the conditions imposed on the exercise of such right, it is not to be inferred that the municipal authorities are stripped of all power to finally determine any matter relating to the general subject. It will be remembered that by section 2640 these authorities are given the control of the streets, and are required to keep them open, in repair and free from nuisance. It is to be noted also that by no statute is power given any tribunal to authorize permanent structures upon or in, or the use of any street, which will incommode the public; the dominant purpose being to facilitate public travel and transportation. It seems therefore clear that there is no power in the probate court to authorize or direct a construction in subways under the streets of a city, in the absence of consent by the municipal authorities. The subject is a broad one, but we are not inclined to add unduly to the already copious literature by extended discussion."

Queen City Telephone Company v. City of Cincinnati, 76 N. E. 392.

THE TELEPHONE'S FUTURE

Address made before the West Virginia Independent Telephone Convention, February 22, 1906

By James B. Hoge

CONSIDERING that so much has been written and said about the Independent telephone situation, past and present, I think we are safe in asserting that fifty per cent of the citizens of the United States at least realize the importance of the telephone, and that the greater part of this number appreciate the fact that the telephone which was put on a commercial basis and popularized by the Independent companies is as essential in carrying on the business and administering to the comforts and social wants of civilized communities as any of the other public utilities now commonly recognized as indispensable.

The discussion of the subject assigned to me, dealing with the future of Independent telephony, cannot fail to be of interest to every stockholder and employe of those companies at present comprising the movement. In handling this subject, I shall endeavor as briefly as possible to point out along a few lines what I consider the probable future of the business in which we are engaged. In doing this, I have no desire to pose as a prophet. We can only anticipate the future by a careful study of the past, and a close observance of present tendencies. Let us, then, with a view of gaining an insight into this probable future of Independent telephony, take a brief review of its past.

The first thing that attracts our attention is its unprecedented growth. Only a few years ago the telephone was considered in much the same light as the automobile to-day. Its cost was prohibitive for any but the well-to-do, and its utility was questioned by most of those who could afford it. For the residence it was looked upon as a luxury or a rather costly plaything; and in business, while recognized as a valuable aid, perhaps, it was by no means considered necessary. Contrast this with the present condition. Its reduced cost has now brought it within the reach of people with only moderate means, and its usefulness and convenience in social affairs, and its indispensability to the business world have been demonstrated beyond doubt. The question of the up-to-date business man is not "Shall I have a telephone?" but "How many telephones must I have?" and in the residence where it has once been adopted, it is considered as indispensable as a sewing machine, a modern clock, or any of the present household necessities, which were once, perhaps, regarded as luxuries.

Eleven years ago there was one telephone to every 225 people in this country; now there is one to every 16. Although the Independent companies are not furnishing all of these additional telephones, the increase is directly due to their entering the telephone field.

While the growth of the future, taking the number of telephones installed in proportion to the people in the country, may not be as great as that of the past, numerically considered, I think it will be much greater and far in excess of the increase in population. Along what lines will this growth take place? In my opinion, it will be in residences and small retail establishments in our cities and towns, and among the dwellers of the rural districts that it will be most noticeable. Practically all business places worthy the name are now equipped with telephones, and the growth there will be more in the nature of extension through the installation of private branch exchanges connecting all departments.

I have estimated that a little less than fifty per cent of the people of this country appreciate the advantages of the telephone; yet my estimate is considered too high by many who say that not more than one-third of the inhabitants of this country really know about the telephone, and that a large percentage of these are not at all familiar with its advantages. In defense of their argument they call attention to the fact that the ratio of telephones in use to the number of people in the country is only one to sixteen, while, they assert, the country will easily support one telephone to every five people. In some localities this is the ratio at present, and in my opinion the country could stand as great a general development.

I think I am not over sanguine in saying that at the end of the next decade, the comfortable home that is not equipped with the telephone will be an exception to the rule. People of moderate means, both in the cities and in the country, will have them installed in their homes, and landlords will equip the places which they have to rent with telephones, just as the modern flats and terraces of to-day have refrigerators and steam heating plants installed, and are equipped with gas stoves and electric light.

So far, we have considered only the increase in local use. The long distance development, to my mind, will be just

as great. The service between neighboring towns and villages will be brought to a very high order, and the interstate and transcontinental business will be developed to an extent scarcely dreamed of to-day. Independent through lines will connect all of the large centers of population, and the congested condition now so prevalent in many places on short hauls will be relieved by increased circuits and better facilities for handling the service between local points, and forwarding it to the large centers for delivery to the through lines. The class of service will be greatly improved, and the transmission on even the longest hauls will not be inferior to that of the best local exchange. The long distance telephone is destined to cover a much larger field than at present. It will not take the place of the telegraph, but will continue to develop new business for itself that does not to-day exist. It is now being quite generally adopted by the railroads in conjunction with their present telegraph systems, and is being used almost exclusively by the interurban traction systems of the country.

We now come to the question of future equipment, which is a most important one from a financial standpoint. Many of the best engineers of the country feel that equipment will be designed so as to permit of greater economies in operating and maintenance. This will probably be accomplished through a combination of the manual and automatic systems, or what might be called the semi-automatic. The wires that have heretofore been taking care of one subscriber or one toll message at a time will be made to provide greater service than is now being obtained. It has already been found possible by combining the telephone and telegraph, to telephone over one pair of wires and at the same time send telegraph messages over the same circuit. The railway companies have made it possible to haul a less amount of fuel and with the same number of men over a given piece of track five times the freight tonnage it was possible to haul fifteen years ago. This has been accomplished by cutting down grades, straightening tracks, and through the use of improved equipment. There is no reason to doubt that still further economies in telephone apparatus will be worked out in the next few years.

The method of charging for the telephone in the future will undoubtedly be that of measured service. All of the other public serving corporations have been compelled to abandon the flat rate plan of making charges and adopted a unit or measured basis. Over sixty per cent of the patrons of the public serving corporations think this is the only just way of making charge for any commodity furnished, and they object to paying more than their share of the cost of such commodities where less than forty per cent reap the benefit. In other words, the flat rate induces every one to be more or less extravagant in the use of the commodity. The forty per cent that are compelled to use abnormal quantities of water, electricity, gas or telephone service would undoubtedly prefer a flat rate as long as possible, but the sixty per cent that can get along with a reasonable amount of service will demand a fair charge on a measured basis for the commodity furnished them. The most striking illustration of this is the fact that practically all of the municipalities owning their own water works have already gone on a measured basis, or are seriously considering the matter of installing meters, and where they have been installed for a few months, so as to give the citizens an opportunity of trying them out, they have been found to give very general satisfaction. The installation of proper meters or measuring devices entails a large expense on all of the public serving corporations, and yet it benefits them for the reason that it cuts down waste that cannot help but be costly to these companies. The meter system for telephone companies will be different in some respects from those in use by water, electric light and gas companies. It will be based on a minimum charge which will entitle the subscriber to a limited number of calls; all over that number to be paid for at a fixed rate per call. This will insure a sufficient revenue from each instrument to cover the cost of maintenance and fixed charges on installation expenses. The minimum charge and rate for additional calls will vary in different localities to suit local conditions. The adoption of this system will be an advantage to both the public and the telephone companies. It will correct many of the abuses to which the telephone is now subjected by many of the best meaning subscribers. Where the telephone is paid for according to the number of calls its use will be limited to necessary business and social calls, and frivolous conversations will be largely eliminated. It will also have a tendency to do away with telephone borrowing, so called. This is one of the most serious abuses of the telephone to-day. It not only annoys the subscriber to have non-subscribers ask for the use of their telephone, but it also ties up their lines so that important calls for them must be refused on the ground that their lines are busy. At present telephone companies are furnishing this service to non-subscribers gratis, which is not fair to invested capital. There are few among those who recognize the importance of the telephone who are not inclined at times to look upon it in the light of a necessary nuisance, for the reason that a large percentage of subscribers do not appreciate the importance of exercising judgment in its use, but call up at very unseasonable times and on every trivial pretext. An extreme case came to my notice a few days ago. A gentleman had been bothered a great deal by his wife and daughters calling him up several times during the day to inquire whether he mailed their letters, and making various other nonsensical inquiries too numerous to mention. At last, in desperation, he secured an injunction preventing them from calling him up at his office. This is, of course, an unusual case, but illustrates my point, and many similar instances showing the ridiculous abuse of the telephone might be cited.

The meter system applied to telephony, by putting the social use of the telephone on a business basis and eliminating other abuses which at present exist, will do much to increase the popularity of the instrument, and will at the same time have a great tendency to increase the number used by making it necessary for those who would enjoy the benefits of a telephone to install one of their own.

TELEPHONY IN AMERICA AND ENGLAND.

The following editorial taken from the Electrical Magazine of London gives an idea of the difference between telephone development in the United States and England as seen from an English viewpoint:

The respective positions of Great Britain and the United States in matters telephonic might well engage the mind of some modern seer. There might be glimpses of the ultimate outcome of affairs vouchsafed to the prophetic vision when turned across the water at the contest between competing parties there is purely one of rates, and does not probably involve the condition of installations or the systems employed. Telephone traffic has, under the stress of competition, become elevated above the regions of experiment, and ranks as a public necessity which cannot be tampered with. American telephones have indeed reached the level of institutions, and as such are respected by those who run them for the public good. In a word, American telephone systems have been made worthy the name, and notwithstanding the keen rivalry of competing interests, the subscriber gets the best possible service. When the eye of the soothsayer is turned on British telephony he will look twice at his telescope to make sure the right end is applied to his optic. He may also be compelled to remove the eyepiece to assure himself of its complete freedom from dust and moisture, for almost absolute fog will meet his anxious, straining gaze. At first sight he might say that British telephone affairs were shrouded in mystery as far as their future was concerned. The recent decision of the Home Government to buy up the National Telephone Company in 1911 and to issue no more licenses to local authorities leaves us in comparative darkness as to what the years succeeding that date may hold for the thousands of patient telephone users in the United Kingdom.

QUESTIONS AND ANSWERS

By J. C. Kelsey

I find that my telephone receiver gives out two distinct notes when held to the transmitter mouthpiece. Reversing the battery, or reversing the receiver will cause this difference. One note is a high one, and the other is a low one. What causes this difference? It seems to me the notes should be the same since nothing but an alternating current flows in the secondary, according to one of your answers in last months' TELEPHONY. Another point is that the low note gives the best transmission.—J. P., Iowa.

We encountered the foregoing at the Iowa convention and it was a new one to us. We came home from that convention and did some testing. We also had the privilege of talking with Mr. Kettering, electrical engineer of the National Cash Register Company, and we propose to give the substance of the conversation to you as he gave it to us. We may not have it straight, and if not, the readers who know about this are invited to come forward.

First, we were told that the main thing was to keep the notes of all the receivers on any one system the same. If all were low, it was preferable to having them mix.

Second, that the low note gives the best local service and that the high note gives the best long distance service. We propose asking our readers why is this?

You have all noticed that if you take a twenty volt battery and place your fingers about the coil and close the circuit through a one hundred ohm relay you will feel but a mild shock. If you leave your fingers about the coil when you break the circuit you will get a severe shock. That is because the time factor of the circuit prevented a rapid rise of the current. In other words, the rate of change of lines of force was slow and consequently the charge induced at the terminals was scarcely felt. Opening the circuit, the lines of force changed to zero value instantly, cutting a maximum amount of lines of force and inducing a high pressure. The energy of each is just the same, but the pressure is higher.

When a transmitter diaphragm is depressed, the resistance of the circuit is lowered and a current starts to rise to full value. It rises slowly, hence the induced effect is comparatively feeble. As the diaphragm recovers, it increases the resistance of the circuit and the current in the circuit lowers instantly. The pressure in the secondary is higher and the receiver diaphragm gets the most violent action.

Now, suppose you have the receiver in a certain connection and you place it to the mouthpiece and the recurring agitation starts a note. As the transmitter diaphragm moves forward, a current is induced in the secondary comparatively feeble. As the diaphragm recovers, the pressure in the secondary is greater. Hence, if this greater induced effect has the same direction that the residual magnetism has, the diaphragm will be drawn closer to the magnet and be released the next instant. It therefore vibrates between its naturally bent position, owing to permanent core magnetism, and a position slightly more bent. Hence, a note of a certain sound.

Suppose you reverse the battery, or reverse the receiver connections; then the recovery of the diaphrgam will induce a pressure in the secondary which will oppose the natural direction of the magnetism. Hence, the diaphragm will be allowed to get further away from the permanent magnet, and an instant later returned to its natural bend. Therefore we have a vibration which alternately allows the diaphragm to move from its natural position, due to the strength of the magnet, to one due to a weaker magnet. Hence, another note.

If the transmitter circuit gave out a pure sine wave form, the note would be the same; but a transmitter circuit current has to grow against the inductance of the primary, and dies down through a non-inductive resistance; hence the difference in the height to which the secondary pressure waves rise.

We wish to take off our hat to the Iowa telephone man as the man who is studying the telephone. We never before had the pleasure of meeting so many vitally interested persons at a convention.

In February TELEPHONY you mentioned a case of a prominent telephone company that turned sub-licensee because its banker forced it to do so. You also compared the "game," as you called it, to the "spider and the fly" story. You are just right there, too. My case is similar to the one you mentioned. I got a local banker interested in my venture and was on the verge of nicely getting on my feet—I started with nothing—when I was practically ordered to sell to the Bell or settle up with the bank. I could not get any assistance from anyone, hence I am now abused in my state for a fault not my own. I will venture to say that more than half of the Independents who sell out and who apparently betray their trust, do so because they have to and cannot protest. I feel my position keenly and am still loyal to the Independent cause, but I suppose all I can do is to suffer in silence.—X. Y. Z.

We wish we could reveal this man's name. We don't know who he is, but know of another case which has been investigated and this satisfies us that this is a typical one. We wish every man could be warned against the sublicensee evil. It vexes us all to hear of an Independent selling out. It has a tendency to make us mistrust our closest neighbor, but we should have a care before we fully condemn. We recall one prominent gentlemen deservedly castigated, who sold to the Bell, yet when one considers the white elephant the poor old Central Union bought, it is hard to see where the man did the Independents any great harm. It is always fair to cripple an enemy, however, and it is possible that this was the gentleman's policy.

We know of another man, prominent, a leader of men, a staunch Independent, sturdy and fearless, who sold out to the Bell. Coming out of a clear sky, all were amazed. We met this man afterward, and with tears in his eyes he showed us proof of his banker's duplicity. This man also started with nothing. He had a $60,000 property and he owed the bank $18,000, or rather, the banker personally. He could have paid this off very nicely, but this good loyal citizen, who kept all the people's money without security, closed out a home enterprise for the benefit of a milk-fed Boston crowd.

The first president of the Interstate Telephone Association went sublicensee. It is well known that he had to sell. He had "bankeritis." I sometimes think Faust was lucky in owing the devil instead of a modern prison like a bank.

Now the lesson from the sublicensee man can be summed up briefly: he was too ambitious. He wanted an all cable plant and bought things when he really did not need them. Our advice would be, don't borrow money. Build slowly. If your prospective subscribers must have telephones, let them buy your stock and help you to build. If you think you must have all the new things, count up your money and see if your earnings will buy them. If they won't, don't buy. Poverty is a preventative of extravagance. Extravagance indicates a weak mind. A man who builds a house with $1,000 hard earned cash on hand will go much more cautiously and economically than a man who has no dfficulty in borrowing the money. Credit is the devil's most fascinating weapon. We cannot believe that any intelligent man will sell out to the Bell for any other reason than irresistible force. We all know that in rare cases promoters have left

undesirable property on your hands and in such cases the broad financial bosom of Boston seems to be welcome, but the Independent who builds his own plant has no such excuse.

Let us reserve harsh judgment. The telephone business is so new that mistakes will happen. Attend your district and state conventions. Realize your strength with the people. Use your present equipment a few months longer. Don't fear competition. There is a plant not more than one hundred and twenty miles from Chicago, purely second-hand—an express board, magneto, serving 2,400 subscribers, in a most disgraceful manner and it continues to grow at the rate of thirty to fifty a month in spite of the fact the Bell has a new common battery exchange and very seductive rates. Here is wise management. They are taking their time to rebuild and are going slowly. They know the service is bad, but the people do not care. Sentiment will last thirty years, and we are reasonably sure that in this town, if the Bell company gave free service, the Independents would keep on gaining just the same.

Please explain the operation of the circuit shown in Figure 1 and explain what it is used for.—Cal.

This is a "ring through" circuit between a Bell common battery exchange and the toll board. Usually the toll board is out in the country, away from induction, and requires supervision. In other words, when the city subscriber answers his toll call, the supervisory signal shows on the toll board. Likewise, when the city party hangs up, a disconnection signal is shown the toll operator.

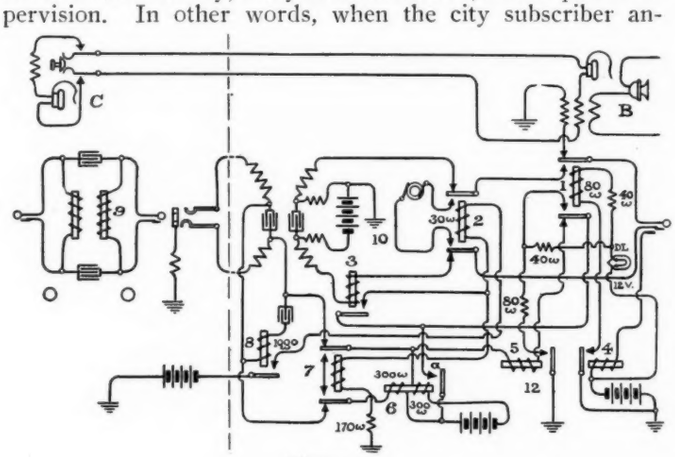


Figure 1.

A call comes over toll for a city party and the toll operator orders up a connection. The switching operator in the city exchange assigns a trunk and inserts the plug. The toll operator can hold the line for five or ten minutes. When the toll party is ready, she simply rings on the circuit and the apparatus relays the generator current on the subscriber's circuit; the bell rings, and the party answers. Toll operator *C* depresses order button and asks *B* for a line. *B* tests, and if the jack multiple is not busy, no click is heard in the receiver, as no current passes through the tertiary winding from upper back contact of relay 1. *B* assigns a trunk and inserts the plug. This energizes relay 4, which makes a circuit through 80-ohm winding of relay 1, a forty ohm resistance, and the lamp *DL*, lighting it. Relay 1 is energized and the busy test is cut off. If *C* should plug in first, then relay 9 would become energized from battery flowing through outer contacts of relay 7, and the 300 ohm windings of relay 6. Both 6 and 9 are energized. Relay 9 will light a lamp, or energize a signal at *C*. Relay 6 will close contact *a*, operate relay 5, light lamp *DL* through an eighty ohm resistance and a forty ohm resistance, in series. But usually *B* is first, lighting the lamp, and *C's* entrance puts it out. It is impossible for the lamp to light when both plugs are in use.

C puts out lamp *DL*, because contact *a* put a forty ohm shunt around *DL*.

When *C* gets a magnetic signal she knows that *B* has plugged into the desired jack and she therefore rings on the line which energizes relay 8. Relay 8 closes a circuit through relay 2, relay 7, and a 170 ohm resistance. Relay 2, being energized, puts the ringing generator on relay springs, and on to the line and rings the subscriber's bell. Relay 7 is also energized by the act of ringing, and when relay 9 is removed from bridge and *C* rings, the short circuit takes its place, keeping relay 6 energized and preventing a false signal to disconnect. When the party answers, relay 3 is energized, and holds relay 7 with its inner contacts short-circuited, so that no false disconnect signal may be given. Relay 7 also cuts battery from the toll trunk, and thereby de-energizes relay 9, which tells *C* that the subscriber has taken his telephone from the hook. When the party hangs up, relay 3 is released, which in turn releases relay 7, which in turn puts battery back on the toll trunk and pulls up relay 9. This lights *C's* lamp and gives her a disconnect. Thereupon *C* pulls out. Relay 6 now has no circuit and it releases contact *a*, which removes shunt forty ohms from lamp *DL* and it lights. This gives *B* signal to pull down.

The diagram is a nine relay circuit and works fairly well. There are too many relays in it, but competition is not a factor here, and hence the relays. Every up-to-date long distance company employs ring-through trunks from toll to local. It would be interesting for any engineer to compare the toll boards at Minneapolis—the Tri-State and the Bell. The Tri-State is simplicity itself. The Bell is bedlam. Our readers may know that very few Bell circuits are simplicity in any form. The concern suffers from over-culture!

We have recently completed a copper metallic line from here to M., a distance of forty miles, parallel with the railway telegraph lines, though separated by a distance of at least fifty feet. This line is transposed every 1,400 feet, is giving first-class service, and is not affected by the grounded lines on the same cross arm; but we are troubled more or less by what we suppose is a static charge of some kind, and occasionally an operator gets a severe shock from the line. It tests clear of grounds, and it is impossible for it to be crossed with electric light wires of any kind, because it is far above them. We go to the terminal rack, almost at any time, and touching one of the line terminals with a wire connected to the ground strip, it will make a spark as large as 100 volts would make.—W. T. Co., Texas.

This is static trouble in which a well insulated line is in a state of static stress, due to an earth seeking potential due to the telegraph. The simplest way would be to permanently bridge a 1,600-ohm ringer, and ground the middle point. This removes the charges before they attain potential enough to spark or shock, without unbalancing or weakening the ringing effect of the line.

While on this subject we will include this letter:

When our systems were installed at *S* and *D* no ground rods or lightning arrestors were provided at the telephones, although we have fuses at our cable poles and have lightning arrestors and a good ground at our central station. We have never had the least bit of trouble from lightning, but the Texas Fire Prevention Association have a representative here, who says that this extra protection must be provided or all insurance on properties where our instruments are installed will be withdrawn. I am sure that he means it, and you can readily see that he has a pretty strong hold upon us. In case it is necessary to put them in, what style of arrestor would you recommend and what would it cost?—G. Co., Texas.

What painstaking gentlemen these insurance people are. This representative will have to travel far to show where a metallic telephone line has ever caused a house to burn. If your telephones have grounded ringing connections at the subscriber's stations, then you should have carbon arrestors. The grounded ringing circuit offers a temptation for lightning charges to appear, but a purely metallic service needs no such protection. The ideal protection is a carbon ar-

restor at the cable pole and a simple fuse at the instrument. Not that you need it for protection, but suppose someone should be killed while using your telephone. If the evidence shows there was no protector, you will be charged with negligence. If a death dealing bolt of lightning followed the wire, no human power could help the talker. We know a man who was all but killed while "rubbering" when a real bolt of lightning came along on a line that had four carbon arrestors. Induced lightning charges are not enough to deal death or make fires, and the arrestors are used primarily to prevent the ringers, or magneto, or condensers from being perturbed. The question of fire and public safety is not a factor, no matter what underwriter opinions exist. To burn a house, or kill a man costs money. It will cost more than all your arrestors. You could install them and charge to insurance, or "exemption from suit." We once killed a neighbor's hog, accidentally, of course, and it was amazing to realize what a valuable hog it was. You may be charged with killing a man "not worth his oats," but when his widow sits in the court room and her lawyer talks to a gallant jury, you will certainly be glad that you had arrestors. Dead men usually assume high cash values. Carbon arrestors should exist at every cable pole and at every central. Following a severe lightning charge happens, your trouble men will not have to hunt all over town cleaning carbons, but can go to nine or ten cable boxes and do all the cleaning in short order. A fuse at the instrument is simply a preventative of what might happen, and if your telephone wires should be near a gas or water pipe, or would become crossed with high tension, a blowing fuse will save disagreeable trouble.

I have noted in numerous cases, at various times, metallic lines are disturbed by what I take to be static electricity. This causes a loud and continual snapping and becomes so strong that a distinct spark can be seen in the lightning arrestor. The trouble is most noticeable on a cold, blustery day. I have a device which stops this trouble without affecting the working of the line. We have the trouble to-day on a metallic line twenty-five miles long, with five stations. By applying my device at our office, the snapping stops at once, and when it is removed the snapping begins again. Advise me if such a device is known, and if not, what would you do about patenting and putting it on the market?—R. F. S., Kans.

We think it is a shame that this young man should not get credit for what is a real invention, so far as he is personally concerned. The idea is old, of course, but the discovery is creditable.

In making transpositions on toll lines, does it make any difference what position the wires take on the arm? For instance, we use a two-pin cross-arm for transposing on a bracket line, systematically placing the right hand wire over. Would the result be the same, electrically, no matter which way the wires were put over, as long as they are transposed? I noticed in February TELEPHONY a question as to what causes the buzzing noise when a receiver is held to the transmitter. In my case, if the instrument is shortcircuited, and the receiver is held to the transmitter, it gives out a howling sound, provided the batteries are in good shape.—J. D. B., Canada.

The order of transposition should be the same. It makes no difference electrically, however. About the howl of the receiver, we refer you to the first question and answer in this number. The question you refer to in February TELEPHONY was copied from a scientific paper, as well as the answer, to show the artistic way some of the inquiries are answered by some of the pseudo-scientific papers.

What is the cause of that buzzing, whistling sound when the transmitter of a telephone set is held to the transmitter? Can this be remedied without affecting transmission, and, if so, how? I would also like to know if there has yet been invented a successful telephone repeater and if so, who is the inventor?

No repeater has been invented. We think such a scheme is impossible, for transmission is a question of quality rather than quantity. Distortion is not eliminated in any of the present attempts. About the whistling noise, see first question, this issue. The howling sound should also come when the receiver is set down on the shelf. A slight breath in the transmitter will start the howl.

Is there a pulsating current drop made? Is it possible to make one that will not operate on alternating and direct current?—W. H. B., Ia.

Yes, there are drops which can be selected by pulsating current, but if an alternating current were passed through the coil it would lose its selective power. It would select on direct currents of certain polarity.

In my line circuit, shown in Figure 2, if the contact *d* closes first the relay rattles, instead of locking, as it should. However, if contact is closed at same time, the operation is all right. The subscriber rings in and energizes the relay, locking it and lighting the lamp. The act of plugging in puts out the line signal.—Ia.

If *a* closes first, the alternating current, having two paths, enters the exchange. One is from ground through lamp and

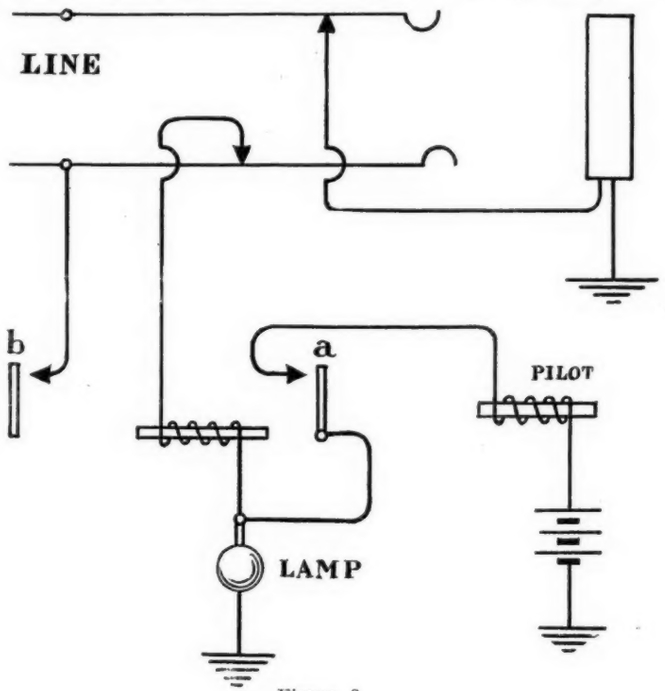


Figure 2.

relay to ground on the other side of line. The other path is through the battery, pilot relay, contact *a*, and relay. Therefore, the alternating current preponderates and the relay is held under its control. If contact *b* is quick, the relay is locked and removed from the alternating influence. The entrance of the plug cuts off the grounds and leaves *a* clear talking circuit.

Is the telephone used for train despatching by any railroad? If so, what road?—H. O. W., Ill.

So far as we know, it is used only on electrical railroads. There may be some steam roads using it, but none of the large trunk systems have adapted it for the purpose you mention. Possibly the operator at Adobe, Colorado, would not have let that Rio Grande train by had be been called by telephone. He would have felt less like an automaton, and kept awake a moment longer, anyway.

Will you tell me how to locate grounds in cables by the receiver tests?—R. E. A., Mass.

We are not familiar with such method. All tests are comparative, at best, and if you have a good pair grounded at a known distance, you will get a certain click. Comparing it with the click through fault, you might get the substance of a test, near enough to put a man out on the cable. We think, however, that most cable faults are found by inspection.

TELEPHONE ENGINEERING

A Paper read before the American Institute of Electrical Engineers, New York, February 23, 1906

By J. J. Carty

ENGINEERING may broadly be divided into two classes, civil and military. Military engineering is that which pertains to the conduct of war and is sufficiently understood to require no description. Civil engineering, as I am now using the term, comprehends all forms of engineering which are conducted without special reference to the operations of war. Falling within this definition of civil engineering we have electrical engineering, mechanical engineering, telegraph engineering, telephone engineering, and some others. As taught in colleges, however, and as generally understood, civil engineering is restricted and deals more especially with that branch of the art which pertains to the construction of bridges, waterworks, railroads, harbor improvements and other public works of like character.

Inasmuch as the telephone is an electrical instrument, and inasmuch as electrical phenomena exert a dominating influence in the telephone art, telephone engineering is classed as a branch of lectrical engineering, although it will be shown as I proceed that telephone engineering comprehends important elements not at all electrical in their character; indeed, it is a recognition of the existence of these elements and a knowledge of how to deal with them adequately which constitutes one of the important requirements of telephone engineering. A good knowledge of electrical laws and a fair acquaintance with electrical machinery may be gained in our electrical schools; and graduates from them are, as a rule, proficient in these matters.

Telephone engineering comprehends not only these, but other factors, the existence of which is not generally recognized. In this paper I shall, owing to the limitations of the time at my disposal to-night, attempt to explain the nature of only some of these factors, indicating their most important bearing upon the general subject. From your own knowledge you will be able to supply many more instances, illustrating, perhaps, better than those which I have chosen, the ideas which I wish to make plain.

To describe the proper scope of telephone engineering in its relation to the telephone industry is to consider the function of the telephone engineer. Not so many years ago it was thought that the functions of the telephone engineer consisted of doing little more than to provide and install switchboards. He was supposed to be consulted occasionally about the station apparatus, and later, when cables were introduced, his activities were extended so as to include the testing of cable after it had been bought and laid.

At the time of which I speak telephone companies took almost an exclusively switchboard view of the telephone business. A building would be selected by someone connected with the company and the engineer would be consulted principally as to the selection of the switchboard and the placing of it in position. The size and location of the building, its relation to the existing and probable future subscribers, and all of the vast number of other factors now considered so vital in determining such matters, received but scant consideration. So it was with cables; whether the cable should contain wires of No. 22, No. 19 or No. 16 gauge; whether the insulation should be of cotton, rubber or gutta percha—these were questions which were as likely to be settled by the purchasing agent as by the engineer.

To one acquainted with the conditions of those times this is not at all surprising, because the telephone engineer of that period shared with all the rest of the world the prevailing ignorance concerning matters which have since been proved by laborious investigations to be governed by well-established laws, the nature of which was then unknown.

The proper status of telephone engineering and the true scope of the functions of the telephone engineer differ as greatly from this primitive view as does the modern telephone system differ from that which obtained in the period about which I have just spoken.

I shall endeavor to give a correct view of the true scope of telephone engineering and to do so I shall broadly discuss a typical problem in telephone management, illustrating the various points I wish to make by reference to certain details which will be considered in connection with the problem chosen.

Let us take the case of New York City, with the suburban territory tributary to it, and assume that it is the intention of the telephone company to install within that territory a telephone system which will work at a proper degree of efficiency and at the same time yield to the investor a fair return upon his investment; and that it is necessary not only that this condition should exist during the first stages of the project, but that the undertaking should be so managed that this condition will be maintained indefinitely. With such a problem before the telephone management, what part of it should the management require the telephone engineer to work out? I shall answer this question by describing in general terms, and sometimes for the purpose of illustration, in considerable detail, what should be the work of the telephone engineer in such a case.

The first question which the engineer must decide is, what is the period for which such construction as may be required should be planned? This is a question of far-reaching importance and requires for its answer that a vast amount of data should be collected, and that careful and long-continued study and investigation should be given to a large number of factors, involving, among other things, first cost and character of construction of the diverse portions of a plant of such complicated nature, annual charges such as maintenance, depreciation and interest, and local conditions bearing upon the possibility of the renewal or extension at some future time of all of the elements of the plant.

In addition to this, due regard must be paid to possible changes in the art and also the fact that, owing to the exigencies of the business, many cases arise where it is necessary to carry out at the beginning, especially in underground work, all of the construction which may ever be needed.

At the outset the question of the period for which to plan depends upon the expectations of growth. With a given expectation of growth, the engineer, by taking into account all of the factors of the case and balancing the annual charges resulting from the initial investment against the cost of reconstruction and rearrangement of the plant at some future time, arrives at the economical period for which to plan.

In this work the predictions as to growth are of the first importance and, inasmuch as accurate predictions of this kind are attended with the greatest difficulty, it is essential that not only the judgment of the engineer, but that of the

business management and all others who might be able to advise in connection with the matter, should be obtained.

At this stage of the work it is of the utmost importance that the bearing of these estimates of growth upon the future of the plant should be thoroughly understood by the business management, whose functions, in the nature of the case, exercise such a profound effect upon the extent and character of such growth. It is the duty of the engineer to make this point clear and to obtain from the business management serious and responsible estimates of future growth.

The number of lines which may be expected having been agreed upon, the question of for how long a period ahead we should plan is determined by a number of circumstances. For such conditions as obtain at New York, the period for much of the construction has been found to be from seventeen to twenty years. This figure is arrived at by taking into account a large number of factors, such as life of the central switchboard—which is placed at about fifteen years, the relative costs of placing in the subways a large number of ducts initially as compared with adding new ducts after a period of about twenty years, the uncertainty regarding the changes in the state of the art, and the difficulty of foretelling with sufficient detail conditions which are expected to obtain during a period so far ahead as twenty years.

In the case chosen for illustration, which was New York, the economical period was found to be about twenty years, and it was attempted to plan for conditions which would obtain in the year 1920 and for each year up to that date. The total number of lines to be provided for in the island of Manhattan is 300,000. The working out of the general plans for providing for this number of lines, which it was expected would be reached by the year 1920, constitutes what is known as the "300,000-line study." To give an idea of the nature of part of the work of the telephone engineer, I shall outline in general terms the character of this study.

Having determined upon 300,000 lines as the proper foundation of the study, and having received the proper authorization from the business management to proceed on that basis, the next step is to plot on a map the probable distribution of these lines. This is done, not by giving the location of each line, but by indicating by blocks the most probable distribution. Here again the judgment of the engineer must be assisted and directed by the business management, for next in importance to determining the total number of lines to be provided for comes the question of their distribution.

The number and distribution of lines having been agreed upon, the next step is to determine the number and arrangement of central office districts, the size and boundaries of these districts and the size and location of the central office switchboards.

It is conceivable, although obviously impracticable, that all of the 300,000 lines might be extended to one central office and operated in switchboards there; it is only necessary to state such a proposition to exclude it from further consideration. On the other hand, it is conceivable that a central office might be established in each block; this also is absurd and needs no further consideration. Somewhere between these two extremes must lie the most economical size and number of central offices. The next stage in the problem is to determine this number; to do this no formula, simple or otherwise, is available. The only practicable method is to lay out the territory to be served, in accordance with a number of different arrangements of districts and centers, starting in, say, with ten centers and extending the study up to as many as thirty or forty, or even more. In the case of all these arrangements there would be certain elements of cost which would not be changed by the different arrangements of central offices assumed. Block-wiring and station instruments are examples of these. These elements of cost are omitted from the comparison. All of the items of cost, however, which vary with the different number and arrangement of central offices are computed, all of these being reduced to annual charges.

From these figures, as applied to the various layouts, the number of central offices and the districts which are ideally most economical may be seen. I say ideally most economical for the reason that the practical application of such results requires that a difficult and very complicated adjustment of the existing plant, to conform as nearly as possible to the ideal condition, must be carried out.

While it must appear, even from the brief statement of the steps of the study thus far described, that a vast amount of labor and computation are involved, it by no means represents all that must be done. Before there can be made a comparison of the relative economies of the various groups of offices, a series of studies within studies must be carried out upon many other important elements of the problem.

The first of these is the switchboard study. Before the switchboard study can be made, general methods of operating must be agreed upon, such as the method of handling toll business, whether it shall be done wholly upon a toll board or partly upon a toll board and partly direct from "A" positions; whether it shall be done wholly upon a "two-number" basis or substantially upon a "particular party" basis. The best method of handling local business must be determined. It must be decided whether the business shall be upon call wires or otherwise; what shall be the capacity of the call wire; what shall be the load which will be assigned to the various operators in the system, this in turn being dependent, among other things, upon the character of the service which it is thought necessary to render.

Having agreed upon these and other fundamental data, the question of the best type of switchboard, whether it shall be full multiple or partial multiple, whether it shall be of the transfer type or otherwise, must be settled. The limit so far as size is concerned of the multiple board, or any other type which may be considered, must be determined. Also there must be settled a very large number of questions cropping out at every point involving maintenance and operating expenses and methods. All of these factors having been duly weighed, the maximum size and type of switchboard is agreed upon.

The switchboard determinations having been made, the type of cable to be employed must be settled upon. Here again a series of studies is necessary. Of first importance in the cable study is the determination of the standard of transmission which is to be employed, not only for talk between offices within a zone such as Manhattan island, but also the standard of transmission which it is necessary to maintain between Manhattan island and the suburbs and between various points in the suburbs passing through Manhattan, and to long-distance points. The importance of this determination will appear when we consider the standard already adopted as the Manhattan standard, which is, assuming the use of the present common-battery apparatus, that the cable employed in Manhattan shall at all times be such that it will give in the worst case a talk as good as could be obtained between two central offices joined by a trunk cable of ten miles of the standard type having the No. 19 gauge conductors, with a mutual capacity of 0.07. If this standard were lowered so as to employ the use of No. 22 gauge cable instead of No. 19, it would permit the use of a trunk cable costing half as much as that required by the present standard, thus reducing the number of ducts required and in that way profoundly affecting the results of the study.

In considering the type of cable employed, not only must the standard of transmission be borne in mind, but in determining upon the specifications for the various types of cable needed a long series of special studies is required. These are conducted with a view to determining upon that form

of construction in each case which will give the highest standard of transmission and at the same time preserve the best mechanical conditions needed for hauling in and out of the duct, and also be so constructed electrically and mechanically as to require a minimum of attention from the maintenance point of view. Not only must the various types of cables be carefully fixed upon when considered strictly from the cable point of view, but where suburban and long-distance circuits are to be considered the problem of loading cables presents itself. This involves so much work and study that to give even a brief outline of what it involves would require a paper which itself would extend far beyond the limits of the time allotted for this very general statement of the case.

The general features of the study having been determined upon and the time having arrived to erect a given central office at a center previously located, the question of obtaining the necessary real estate and erecting the central office building presents itself. In such cases it is usually impossible to obtain the desired property exactly at the ideal center. Practical real estate conditions must be met and, of the various parcels of property offered, that is chosen which, taking into account all of the circumstances of the case, results in the lowest annual charges. The distance of a given site from the main subways, the character of the neighboring buildings, the price at which the property can be obtained, the possibility of reconstructing the existing building which may be upon the property or the necessity of removing it and erecting a new one, and other similar points—all these have to be carefully worked out before a report can be made to the management stting forth the most economical land to purchase.

In other words, before even the land is bought a study must be made of a telephone building which might be erected upon it. Inasmuch as in nearly every case many different properties must be considered, studies for several different buildings must be carried out before the best combination can be determined. After these matters have been decided upon, the details of construction, of the building must be further studied. This, as can readily be understood, naturally involves a vast amount of engineering work.

Thus far I have hastily sketched the outlines of a telephone development study as it is more particularly concerned with the local plant, but as the local plant must be, as time goes on, more and more intimately connected with neighboring plants in the suburbs, and with more distant plants reached by long-distance wires, most careful study must be given to the best methods of establishing proper relations with those plants.

Without attempting to outline in any detail the nature and extent of the work involved in the methods employed in making a suburban toll-line study, and without going at all into the question of methods of establishing the service to long-distance points, I will say that, considering the broad features of these various classes of conditions, it has been found best, in the particular case which I have taken for my example, to divide the telephone business into three classes: local, suburban and long distance.

In determining what shall constitute the local class the engineer finds himself engaged in a problem of great magnitude which primarily concerns the business management and which is affected by important public and economic considerations as well as by engineering factors and methods. If the local zone is made too extensive it greatly increases the magnitude of the trunk line plant from which no toll revenue can be derived. This fact reacts upon the rates in such a manner as to make it impossible to give as low a station rate as might otherwise be the case. This tends to restrict the growth of stations and hence will act as a check upon the growth of the business at large.

The local zones having been determined upon, it must next be decided what shall be the limits of the suburban business and what shall be classed as long-distance business. Without attempting to explain the various points necessary to be taken into account in determining these questions, I will say that they involve not only those physical factors ordinarily considered to constitute engineering, but that they involve the methods of calling which may be permissible on the part of the subscriber, the entire system of toll rates which may be adopted by the telephone company, the question of whether the subscribers' names and numbers should be listed or not, and other questions of this nature.

When I review the outline of the methods and magnitude of a telephone development study, such as I have here briefly sketched, I am not surprised that some who superficially consider the subject are inclined to doubt the value of results obtained in this way. This feeling is strengthened when they consider the nature of some of the fundamental data upon which all of the work rests. For instance, unless there is made a fairly correct forecast of the probable growth of subscribers' lines for a period of fifteen or twenty years in advance, it is clear that substantial errors will be made; but more than this, it is necessary not only to forecast the total number of lines expected, but their location must be determined within close limits. But this is by no means all. Not only must the location of the lines be decided upon, but the number of calls per day which may be expected over each line must be estimated; not only must the number of calls which are expected be correctly determined, but the time of the day during which these calls may be expected must be arrived at in some manner. Even more than this must be done, because it is necessary not only to know all of these facts, but also it must be known where the calls are to go. We must also know what proportion of these are likely to be toll calls, what proportion long-distance calls, and various other factors of like nature must be determined.

There can be no doubt that telephone development, as thus viewed and as correctly viewed, presents abundant opportunities for errors, and that such errors must lead to expenditures of large sums of money, which, if infallible data were obtained, would not be required.

But conceding all this, what is the alternative method which we can follow? If we are to abandon the method of study herein described, what shall be substituted for it? By what plan shall we proceed which will enable us to arrive at a more economically constructed system? What method shall we adopt which will enable us to proceed without answering such questions as those which the present method of study undertakes to answer? It is obvious that what are erroneously called "common-sense" methods might be employed. Buildings might be erected in various locations in a city, chosen after an inspection of the region; they might be substantially constructed and provided with switchboards. These buildings might be joined together by subways, and in the subways cables could be located. Suburban and long-distance trunk line subways might also be constructed, and there is no doubt that according to such a plan telephone business could be carried on. But have we, after all, in following this method, avoided answering any or all of the questions with which the study undertakes to deal? Most certainly we have not, and while it might not be appreciated, every step taken in this so-called common-sense method really makes a direct, though unconscious and unintelligent, answer to all of the questions propounded and dealt with in the formal study. If, following this common-sense method, it is decided to erect at a given location a central office building with a switchboard of a given size, this office must be intended to serve a district of some definite form. If, as would of course be the case, other central office buildings are erected at other locations, they

too must be constructed with reference to fixed districts and their number must be determined with reference to the expected growth in subscribers; so that after all the magnitude of the expected growth is a factor which is unconsciously dealt with. But in determining upon the size of the switchboard and its construction, whether we realize it or not, a definite, though unwitting, answer is made to the questions of what shall be the rate of calling, what shall be the destination of the calls, what shall be their character, and at what time they shall occur. The switchboard and building must be planned for some set of conditions which can be established only by data of this character. Merely ignoring these questions and erecting the switchboard and arranging central offices without making a study does not avoid answering the questions, for by the construction carried out a direct and unequivocal answer to all of these questions is made, yet without giving consideration to any of them or even recognizing their existence.

So it is with subway construction. It is easy enough, after central offices have been located, to plan for a subway joining those offices, but somebody must answer the question of how many ducts shall be provided in this subway. This can be done by the method outlined in describing the study, or it can be determined at the time by somebody who is opening the streets. It may be done, on the one hand, by engineers after careful study with all the facts before them, and after having analyzed the statistics of the past and having exhausted all possible methods of throwing light upon the subject; or it may be done by a man in the street with a pickaxe. Those who would follow the pickaxe method would not avoid questions which the engineer has recognized and has undertaken to answer. They would, by the number of ducts they put down and by the character and magnitude of the other construction, give their answer to all of these questions without having considered any of them. As to which of these two methods should be followed, the telephone company must decide.

Thus far in my outline of that part of the telephone engineer's duties which pertain to development studies, I have dealt more particularly with the physical features of the work. Ordinarily, engineering has to do principally, if not exclusively, with physical factors, but telephone engineering has not only to deal with physical factors of the utmost complexity, but it has also to deal with commercial questions which, of themselves, would seem to be only remotely connected with the work of the telephone engineer, but which really vitally affect it. Telephone engineering presents more factors of this nature than, I think, are to be found in many other branches. Take the case of a civil engineer who has before him the problem of constructing a masonry dam. This presents an instance involving solely physical factors. The stability of the dam or its capabilities of impounding the necessary amount of water are in no way affected by any action which the board of directors of the water works company may take with reference to its dealings with their customers.

It is not so with telephone engineering for, as I will presently show, a telephone toll line and switchboard system might be designed in accordance with the highest state of the art and constructed so as to give the best efficiency and yet by the action of the business management, causing the adoption of what might seem to be a reasonable commercial practice, the operativeness of the switchboard system might be totally destroyed. This idea will be readily comprehended when we consider what would happen to the present toll board at Cortlandt street, operating on the recording basis, using the two-number method of calling, if, by some change in business plans, the particular-party method in use extensively in many other localities were adopted. Only a brief consideration of this case is required to show that, in addition to the present recording operator, a second set of operators would have to be employed, who would be required to call up the subscriber desiring the toll connection and obtain from him the details of his call. The adoption of such a method, while in itself a wasteful and inefficient one, would in the case I have chosen require the radical reconstruction of our entire toll-board plant. More than this, the adoption of such a method would render it impracticable to follow the direct-line trunking method which is now possible by the use of the two-number plan of calling. The abandonment of this method would require that such toll lines be handled from toll boards. The magnitude of the revolution which this would make in the engineer's plans will be seen when I say that whereas, by the two-number method, one toll board occupying one floor of the Cortlandt street exchange is sufficient, there would be required, if the particular party method were employed exclusively, as many as five or six toll boards occupying five or six floors in the Cortlandt street building, and requiring five or six times as many operators for their working. This is one of the best examples which could be given as showing the peculiar relation which obtains between telephone engineering and the business management of telephone companies.

Another example, perhaps even more far-reaching in its effect upon the work of the engineer, is the question of whether the telephone company shall charge for its service on the flat-rate plan, or by messages as is now generally the case in this neighborhood.

Under the flat-rate method of charging, in large cities, the more times the customer uses his telephone during the day the greater is the expense to the telephone company. This is due not only to the increased number of operators required, but also to the increased switchboard sections needed for them and to the increased trunk-line plant. By the method of flat-rate charging there is no motive for the telephone company to encourage an increase in the number of calls. For this reason a flat-rate plan would have to be so engineered and the rate would have to be so established that extension stations, desk stands and other auxiliaries tending to make the use of the telephone easy and therefore more frequent, must be discouraged.

The existence of the flat rate in such cases would not only be attended by all of these consequences, but many others, one of which in particular is of great importance. I refer to the excessive use of the subscribers' line which such a rate engenders. The consequence of this excessive use is that the busy calls attain such serious proportions that it is difficult, if not absolutely impossible, to give satisfactory service. This trouble from busy calls has at times attained such serious proportions that engineers, in various places, have exerted extraordinary efforts to mitigate the evil, but without success. This difficulty having been caused by commercial methods could not be overcome by the engineer employing physical methods. The solution of this difficulty lay with the business management, and consisted in the adoption of a proper system of message rates. Once such a method was put into force all of these difficulties which I have enumerated as pertaining to the flat rate, and many others which I have not taken the time to explain, disappeared.

While engineers were endeavoring to plan systems in accordance with the flat-rate method, difficulties were encountered at every hand. As soon as the message-rate system was adopted all of these difficulties disappeared, and many positive advantages, not even suspected as residing in the message-rate plan, developed. Under the flat-rate system there was every temptation for the subscriber to send as many calls as possible over one line. This, as I have already stated, resulted in overcrowding the line and was attended by bad reactions of every kind. Those having but small use for a telephone could not afford to pay the high flat rate which that method of working made it necessary

for the telephone company to charge. The consequence of this was that only those having a large number of calls installed a telephone, and those having small use of the telephone made it a practice to use the telephones of their neighbors or did not employ the telephone at all. This practice on the part of the small user was a natural one in view of the fact that under the flat rate the telephone subscriber considered that it cost him nothing to allow his neighbor to use his telephone. All of this resulted in a system largely composed of overloaded lines. Under the conditions obtaining in our large cities the relief of an overloaded line can be obtained only at the expense of a second line, which in most cases meant doubling the cost of the telephone service. For this and many other reasons the desired relief could not be obtained under the flat-rate system.

By introducing into the large cities the message-rate system, and by placing proper limits on the load which should be carried upon one line, and by providing a graduated system whereby additional lines could be obtained on a basis proportionate to the amount of their use, relief from this overloading was afforded. More than this, under the message-rate system it is obviously for the interest of the telephone company to encourage the use of the telephone in every manner. For this reason it became feasible and desirable to install as many auxiliary instruments as possible. This was accomplished by providing for those who required two or more lines a switchboard located at the subscribers' premises, this switchboard being so constructed that as many local stations as might be required could be installed at a moderate equipment charge. Each one of these stations is so equipped that it may be connected with a trunk line to the central office or it may be connected to any of the other local stations without communicating with the central office. In this way not only was the central office substantially changed, but a very important advantage was obtained. Talking between local stations at a local or private branch exchange switchboard could be accomplished without any message charge, and constituted an important by-product costing the subscriber practically nothing. This development not only reacted upon the central office engineering and the general engineering of the plant, but also completely changed the state of affairs with reference to speaking-tube telephones, practically limiting the former speaking-tube system to special and peculiar conditions.

Considering these two examples of the method of charging which shall be followed upon toll lines and the method of charging which shall be adopted upon subscribers' lines, it will be seen that they in a most extraordinary manner affect the work of the telephone engineer. So profoundly do such consideration affect the proper engineering of the telephone plant that it must be said that good telephone engineering cannot exist side by side with a bad system of rates or with improper business methods and organizations. Nothing more forcible than these examples needs to be mentioned in order to show the intimate relations between telephone engineering and business management.

From time to time, engineering methods involving new principles are brought forth. These, when found to affect the methods of the business office, should be submitted to the business management with a full and clear statement of their bearings upon the commercial work of the company. On the other hand there are, from time to time, business proposals and commercial methods which are under consideration by the business management of telephone companies and which, apparently, are only remotely or not at all related to engineering. In view of the many unexpected and important reactions which these proposals may have upon the engineering of the telephone plant, it becomes of the first importance that they should be scrutinized carefully from an engineering point of view, unless it is conclusively apparent that they will be without effect upon the engineers' plans.

Many other instances besides those which I have enumerated might be adduced, such as the effect of the three-minute toll period method of charging upon the various features of suburban trunking methods; and the complicated and disastrous reactions produced by the introduction of many of the party-line systems.

Thus far I have dealt with some of the more general methods of telephone engineering, indicating briefly their nature. One of the very important features of telephone engineering consists in the design and construction of the varied machinery constituting the modern telephone central office apparatus. A brief statement, therefore, indicating the character of the work which devolves upon the telephone engineer in connection with central office design is pertinent.

During the ten years just passed, a revolution has taken place in the design and construction of telephone switchboards, the magneto-switchboard, so-called, having given way to the common battery switchboard. This radical change in telephone practice made new demands upon the telephone engineer, for it became necessary for him to introduce into central office construction certain elements which had theretofore been utilized principally in engineering work involving electric light and power installations.

In the magneto system signaling from the subscriber's station to the central office was accomplished by means of a small alternating-current generator turned by hand, and the current supply needed in the working of the transmitter was obtained from a few cells of primary battery located at the subscriber's station. By the introduction of the common battery system all of this was changed. The magneto-generator was dispensed with as was the primary battery, the current supply for operating the transmitter, as well as that required to enable the subscriber to signal, being drawn from a large storage battery located at the central office.

In the case of a 10,000-line switchboard the storage battery must be capable of giving an average discharge of 500 amperes, and to ensure proper working conditions it must be capable of giving a safe discharge as high as 2,000 amperes. For charging such a battery as this suitable machines must be employed, and these must be present in duplicate or triplicate. The standard machine used for charging a battery of this type delivers 1,000 amperes.

The introduction of currents such as these, and the introduction of these machines and of a large number of auxiliary machines generating currents for special purposes, has resulted in the creation of a power plant at each central office, upon which the operation of the telephone switchboard and apparatus is wholly dependent. The introduction of these larger currents has necessitated most careful and refined methods of fusing and protecting the delicate telephone apparatus. These protective methods, while following the general principles of such methods in electric light and power practice, are vastly more refined in their working and call for a hitherto unattained degree of precision in the manufacture of such apparatus.

While the storage batteries and auxiliary machinery employed in telephone power plants are far from equaling the magnitude of similar apparatus employed in electric light and power stations, nevertheless they have become such a vital element of the successful engineering of a telephone central office that they require on the part of the telephone engineer a special knowledge of this branch of electrical engineering, which was formerly not requisite. This class of apparatus must also be considered by the telephone engineer in a special manner, for not only must it be properly constructed from the electric light and power point of view, but peculiar conditions must be provided for on account of

the association of this apparatus with such a delicate instrument as the telephone.

Where a dynamo is to be constructed to operate incandescent lamps, let us say, certain minute fluctuations in the potential of the machine are permissible. Were such a machine, however, to be used in connection with telephone circuits, these fluctuations in potential would be sufficient to produce such constant humming in the telephone as to render it inoperative. Hence a greater refinement of the construction of these machines in this respect is imperative where they are employed in the telephone power plant.

So it is with the storage battery, where a number of telephones are supplied by current from one storage battery; even almost infinitesimal changes in the voltage of the battery might be propagated to the telephone lines connected therewith and produce disturbances. For this reason storage-battery practice from the telephone point of view presents problems which are different from those encountered elsewhere.

One of the interesting and important developments in the modern common battery switchboards is the extensive use which has been made of incandescent lamps in signaling. Hundreds of thousands of these lamps are now used for telephone signaling, and the requirements of the telephone art have called for special refinement in the design and manufacture of these lamps.

While the common battery switchboards as now used in all of the large central offices represent a revolution in methods, as compared with the magneto system, there are certain elements formerly used in the magneto system which have persisted. Among these is the multiple-board principle. This principle, as is well known, consists in extending a number of lines to different points in the switchboard so that it is possible to connect with the mat any one of these points. The multiple system is opposed to the transfer system, which is one wherein the lines are not so extended or multiplied to different points, but proceed directly to a special location from which trunk lines extend to other parts of the switchboard, so as to provide for making the necessary connections. It is safe to say that during the past twenty years there has been no question of switchboard design that has been the occasion of so much discussion and controversy as that pertaining to the extent to which the multiple principle should be adopted. It is interesting to note therefore that no type of switchboard of any magnitude is now seriously considered which does not in a very substantial manner utilize this multiple principle.

In a self-contained central office, with relatively few trunk lines extending to other offices, it is found most economical to multiple all of the subscribers' lines to each section of switchboard. In very large cities, where a number of central offices are required and where the amount of trunking between the different central offices is relatively large, the advantage of multiplying all of the subscribers' lines to each section is not so apparent as in the case of the self-contained office, and this fact has led many to the conclu that for such situations multiple boards are not adapted. But this is going farther than the fact warrants, for while it is true that the advantage of multiplying the subscribers' lines to all of the sections of the switchboard becomes less and less as the percentage of trunking increases, it is still a fact that the point is never reached where the multiple principle should be abandoned entirely.

The truth of this proposition may be easily established by assuming that in a large city all of the calls must be trunked, and that none of them is local to the office in which they originate. In such a case as this it is obvious that nothing could be gained by extending all of the subscribers' lines before each of the operators. On the other hand, it is still essential that the outgoing trunk lines should be extended, or multiplied, before all of the subscribers' operators, and all of the subscribers' lines should be multipled before the trunk operators. While the case of an office without any local calls is one which could not occur in practice, there are situations in which the amount of local calls is so small that it will not pay to multiple the subscribers' lines to all of the subscribers' operators. Just when this point is reached is a question to be determined in each case.

Thus far the instances where it has been found possible to omit this multiplying of the subscribers' lines are few, but as time goes on the number of these cases must increase; but at no time, so far as can now be seen, will the point be reached where the multiple principle itself will be abandoned. Even in the automatic switchboards, which constitute one of the most interesting of the recent developments, the multiple principle is found to be essential to the working of all types of automatic boards thus far proposed, wherever the switchboard is of any substantial magnitude.

With reference to this matter of automatic telephone switchboards I may say that such types of apparatus have, during the past few years, become a matter of great interest and the subject of much discussion among telephone engineers, and as I have made a number of special investigations into this subject I think it would be of interest if I here briefly state some of the results which I have obtained.

Upon a first view of the case the idea of using automatic machines and thus doing away with the labor of telephone operators appeals with much force, and the wonderful things which have been accomplished by American labor-saving inventions naturally come to mind. Among all of these projects for saving labor by automatic machines none seems more wonderful than the little machine which, when manipulated by the subscriber, will put him into communication with anyone out of thousands or tens of thousands of people scattered over a wide area. But in order that an automatic telephone switchboard should be properly called a labor-saving machine it must accomplish its work at an expense entailing less annual charges than would be required by the system which it attempts to displace. If it should be found that the annual charges of operating the automatic system were equal to or greater than the annual charges of operating the manual system, then the automatic system would not be a labor-saving one, and, considered from the standpoint of costs, would be a failure. Whatever merit it would have, in that event, must be looked for in some very superior results in the way of service. From this point of view I have considered the merits of the various automatic switchboard systems which have thus far been installed.

I find that, taking into account all of the factors involved, and which go to make up the total annual charges which could properly be placed against the automatic switchboard system, on the one hand, and the manual system on the other hand, leaving out of account switchboards suitable for use only in small villages, and making comparison up to switchboards of 10,000 lines capacity, that the annual charges upon the automatic system are substantially greater than the annual charges upon a manual system operated on the common battery multiple plan. From the standpoint of costs, therefore, the automatic system fails when placed in competition with the common battery multiple-board operated manually.

Having found that the automatic system could not successfully compete with the manual system in point of costs and annual charges, I made a careful investigation to determine whether the automatic system possessed any advantages of working over the manual system which might compensate for the extra annual charges which its use necessitates. For this purpose there were made about 7,500 service tests on manual switchboards and automatic switchboards operating under practical conditions in different parts of the country. The results of these tests showed that

the manual system possessed a most substantial greater degree of reliability than the automatic system. The difference in speed of connection between the two systems was so small as not to constitute a practical factor, the time elapsing between the start of the call and the answer of the called subscriber being in the case of the automatic system 19.9 seconds, and in the case of the manual system 21.7 seconds. These figures include the time taken by the subscriber to answer, and even this small difference of time was found to be due to the fact that the subscribers whose lines were tested answered somewhat quicker in the automatic system than in the manual system. It will be seen, therefore, from these tests that the automatic system possesses no practical service advantages over the manual system, and that it contains no elements sufficient to warrant any part of the extra cost which its use involves. A full consideration of the details of the comparison of these types of switchboards would lead me far beyond the limits assigned to this paper, and would only result in showing that the alleged advantage of doing away with the operators at the central office is imaginary and not real.

All of the foregoing relates to switchboard systems smaller than 10,000 lines, no automatic switchboard of larger size having been installed.

In order to determine whether for systems larger than 10,000 lines the automatic principle might be applicable, I made a study, assuming a system of 100,000 lines to be equipped with automatic switchboards, and compared this with a similar system equipped with common battery multiple switchboards operated on the manual basis. Here again the comparison is in favor of the manual board, both in point of annual charges and in respect to the service.

In applying the automatic switchboard to this 100,000-line study, it was necessary to leave out of consideration a very large class of difficulties which crop out at every turn when the attempt is made to apply the automatic principle to the complex conditions which obtain in and around all large cities. Inasmuch, however, as the study showed that the automatic system is inferior to the manual system for a 100,000-line plant, it became unnecessary to take into account the large number of adverse factors which must be charged against the automatic plan of working. So important are these factors that it is safe to say that even if the annual charges on the automatic system were substantially less than those on the manual system, they would constitute such a serious objection to the automatic system as to bar its use.

Throughout these investigations the importance of retaining at the central office operators to receive and attend to the subscribers' calls has been emphasized in so many important and unexpected ways that I have no hesitation in saying that no plan thus far employed, which requires that the subscriber should operate a machine and send his call automatically to the central office, can successfully compete with the plan which requires that the subscriber should remove the telephone from the hook and send the call orally to an operator at the central office.

Closely associated and interwoven with the design and construction involved in telephone engineering is the matter of the materials to be used. To the proper choice of material, as well as to their proper arrangement in the plant, the telephone engineer must devote serious and constant attention. All materials which are permitted to form a part of the telephone plant must be carefully studied by the telephone engineer, so as to obtain out of all those possible to use those which offer the best combination of first cost, durability, low annual charges and high efficiency.

Considering the almost innumerable varieties of materials used, all of which must be covered by standard specifications, the work of this branch of telephone engineering, taken by itself, would require so much time to describe that I will not attempt to enter into it in any detail, except to say that it constitutes one of the important duties of the telephone engineer.

Intimately connected with this matter of the choice of material and making the specifications therefor is the complementary function of accepting or rejecting that which is offered. The drawing up of the specifications must be attended to with the utmost care, so that they may be placed in the hands of the purchasing agent, and be sufficiently intelligible so that any manufacturer or person skilled in the art can understand their purport and supply without further information the articles desired. The drawing of such specifications is of very great importance, for not only must the articles desired be clearly described, but the language used must be such that no material other than that desired can be furnished under this specification. At the same time, while every precaution must be adopted in the specification to exclude undesirable material, great care must be exercised that undue and excessive requirements should not be specified. Otherwise the cost of the materials would be unnecessarily increased. Here, as well as at almost every turn in the work of the telephone engineer, there is no safe side. If the specification is made too rigorous, and calls for material of a quality in excess of that which is demanded by the nature of the construction, loss will result. On the other hand, if the specification is drawn loosely or so as to admit inferior material, loss will result, owing to defective working of the construction in which such materials would enter.

So far as I have gone, I have described the more typical functions of the telephone engineer. In addition to this, there are constantly arising questions demanding special investigation. The range of these questions is almost unlimited, and their adequate treatment requires most laborious and serious effort on the part of the telephone engineer. While their range is so extended as to cover almost every field of engineering in scientific progress, and while the telephone engineer cannot be expected to be expert in all departments of scientific investigation, he is required to direct such investigations, employing, as his judgment may dictate, experts in various departments to report upon those phases of the work in regard to which they may be best qualified to speak.

Thus far I have discussed the work of the telephone engineer without particularly calling attention to his relations to the telephone organization at large. This relation can best be understood by stating that the telephone engineer in every well-organized telephone company must, in the first place, broadly determine all of the important features of the plant of the company, and he must in detail decide what shall be the nature of the construction and the method of operation of every single item which constitutes the physical property of the telephone company. If, through defective design, a telephone cable is found to be ineffective, mechanically or electrically, it may be said in a properly organized telephone company that the fault lies with the telephone engineer. If, through defective design, the telephone switchboard is found to be unsuitable with respect to its maintenance or operation, the fault lies with the telephone engineer. So on through all of a multitude of items which constitute a telephone system. If, in a well organized and well administered telephone company, the plant is not constructed in accordance with the best state of the art, the fault lies with the telephone engineer.

That this must be so will be made clear by describing the method which obtains in well organized telephone companies of getting from the board of directors the necessary appropriations for carrying out all construction and reconstruction work. Under such conditions a development study will have been made and will have been approved by the business management. The traffic department will have,

from its careful watching of the extent of the available facilities, given due notice of the time at which additions, changes or renewals of switchboard facilities may be required, all of which are presumed to have been contemplated in the broad plans already approved by the business management. The construction department will have, from its constant watching of the available cable and line facilities, given due notice of such changes, renewals and additions as may be required in these parts of the plant to accommodate the growing business and fit in with the approved general plant. In the case of traffic department, the demands of the service having been thoroughly studied by them and the essential data having been supplied to the engineer, the necessary detail studies, plans and specifications are prepared by him and an estimate prepared for the work required. A case will be made out setting forth the nature of the work and the necessity therefor, and an estimate showing its cost and a specification describing the work in detail will be submitted to the management, and if in proper form it will be duly approved. The estimate and specification will then be turned over to the proper department and, depending upon the nature of the construction, the work will be executed by the telephone company itself or by a contractor.

The work must be supervised, as far as may be necessary, by the engineer, and upon its completion he must accept it or reject it. Having accepted it and having made a report to that effect to the business management, the transaction is completed. By this acceptance of the work, the engineer assumes full responsibility for its efficiency.

So it is with the cable plant, except in this instance as a matter of administrative efficiency, the superintendent of construction may submit detailed plans for the extension to the cable and wire plants, following, however, general lines which have already been standardized by the engineer. These plans and specifications having been accepted by the engineer, and the work having been passed through the regular routine, the ultimate responsibility rests in the engineer's office.

So it is with other features of the work. From beginning to end the engineer is thus placed in a position to exercise a veto power upon any adverse methods which might otherwise be allowed to creep in.

The carrying out of this estimate system in this way places final responsibility upon the engineer and recognizes in the most practical manner one of his most important functions, which is to co-ordinate the various elements which must be put together in such a manner as to avoid conflict and produce a consistent symmetrical organism, each part of which will be designed and constructed with due reference to the functions which it must perform and also with due regard to the functions and importance of all other elements in the system.

The importance of this co-ordinating function cannot be overestimated and it is only at some central point that such function can be exercised. Being judged from the maintenance point of view, a piece of apparatus might have qualities of a high order, but when considered with reference to its effect upon the traffic, difficulties might be discovered which would entirely overweigh the maintenance advantages. In such a case the conflicting claims with respect to the apparatus must be considered by the engineer, and his decision must be rendered with a view to producing the best net result.

Again, systems might be proposed which, considered solely from the maintenance, construction and traffic points of view, might seem to possess all of the advantages of an ideal arrangement, but when considered from the standpoint of the efficiency of transmission might be found to involve an impairment of transmission on one hand or such increase in cable and line costs on the other hand as to render its use out of the question.

In order to exercise proper co-ordinating functions, it is essential that the engineer should be placed and should maintain himself in such relations with all of the departments of the telephone organization that he may get from them and fairly consider all of the projects and ideas pertaining to the design, operation, construction and maintenance of the plant which naturally originate in such departments when they are conducted with proper efficiency.

Viewed from this standpoint, it will be seen that while the function of the engineer with relation to the plant is of the utmost importance, nevertheless the work of the traffic, maintenance, construction and other departments has such an important bearing upon the whole system that the successful engineering of a telephone system must be regarded not only as the work of the engineer himself but as the work of all the other departments concerned. Not only this but what is still more important, the successful engineering of a telephone plant depends upon proper business management, as I have indicated by several striking examples. Without an intelligent, progressive and broad-gauged business management, there cannot be good telephone engineering.

GIRL AS LINEMAN.

Because she is doing her sick fathers work in all kinds of weather, Miss Grace Brenneman, a twenty-year-old girl, is a heroine in the eyes of her neighbors at Lindsey, Ohio.

Miss Grace Brennenann.

J. W. Brennemann is maneger of the Lindsey Home Telephone Company. Recently he was taken too sick to do the repair work, and so that the father might not lose his position, the daughter essayed to perform that task for him. Attired in a short skirt and shirtwaist, she climbs telephone poles and makes repairs as easily as a regular lineman.

In a letter to TELEPHONY Miss Brennemann gives the following description of her work:

"You kindly requested me to give you a description of my work as telephone girl. We had the central in our house for three years and I was chief operator during that time and my father was manager. Owing to my father's sickness I looked after the entire exchange. I had the switchboard moved out of the house and put in a more centrally located place. I would start out every afternoon with my chest of tools and wire trying to find and clear any trouble. I replaced induction coils, bells and telephones. I never found any trouble too hard to clear. It was a common thing to climb poles to replace fuses. I liked the work, but would prefer being chief operator. Our system has two hundred telephones in operation."

The guests of the Crowner House at Watertown, New York, witnessed a curious sight the other night in front of the hotel. A large rat had in some manner and for some cause run up a tall telephone pole and seemingly did not know how to get down. It turned around several times on the top of the pole and finally did the high wire act and walked across to the next pole. Some of the guests tried to dislodge him from his perch by throwing stones, but their aim was too poor. The rodent performed the feat several times and was still in the air when the shades of night fell upon the earth.

CABLE TELEPHONY

By Charles Adams Randall

I HAVE observed that great interest is now being shown in reference to the transmission of speech over ocean cables, and that many arguments pro and con are being advanced. One method for a "Proposed Telephone Between London and New York" has been described in "The World's Work" for February, 1906, and indicates, I think, the great importance of the successful accomplishment of this much desired result. I am of the opinion that the subject is one of interest to all, and more especially to those engaged in telephone work, and I have thought that possibly a statement as to my personal experiences in and knowledge of this branch of electrical science, and my views in regard to same might perhaps help the cause, or at least be of more than passing interest.

Of the laws, theories and the claims of telegraph engineers and experts in reference to "Retardation," "Attenuation" and "Time Limit" in the transmission of electric currents or impulses over long distances, or at a rapid rate, and in reference to the "static effects" observed in cable work on submerged and underground cables, as applied to telegraphy—and claimed by many to apply equally to telephony—I have some knowledge after many years of study, observation and practical work.

I am also aware that many scientists and electrical experts claim that the sound-produced currents of telephony cannot be transmitted over cables, the distance possible in telegraphy, owing, it is said, to their greater number and rapidity, their attenuation and retardation, the resistance and static conditions, so-called, of a cable of some length, and because of this retardation, attenuation and the static effects, the transmitted speech is either distorted or inaudible.

It is claimed that voice-caused currents have their maximum energy at the transmitter, their action being graphically illustrated by lines, sharp or curved, showing a wide movement on both sides of an imaginary central line, which movements gradually decrease and finally appear as a continuous line, and it is argued that when this condition prevails no effect can be produced upon the telephone receiver, and that the limit of distance for speech transmission has been more than reached.

At this point I wish to state that I take exception to all of these theories, laws and erroneous conclusions, and to suggest that possibly the laws governing telegraphic transmission cannot and do not apply to telephony; that there is no such thing or effect in telephony as the retardation of the sound-produced electric currents or impulses, as understood in telegraphy; and, further, that the telephonic impulses of a given energy will travel farther and more quickly, and with less attenuation, than corresponding telegraph currents, and also that they are less affected by the so-called static conditions of a cable, or, that in their use upon a cable the same static conditions are not produced, whichever it may be, and probably the latter, and, therefore, that the strict application to telephony of the laws relating to telegraphy is a serious error.

An illustration in proof is that telephonic transmission of speech, over a circuit wide open at some point, is possible and practicable. This cannot be done in telegraphy, which certainly proves that different electrical conditions of the circuit is produced in the operation of the two methods of transmission, and also that different results and effects are obtained thereby.

In the transmission of messages by telegraph using the maximum current energy required and permissable over a given distance at a predetermined rate of speed, the recorded signals of dots and dashes run together by "tailing" or retardation, and the signals are unreadable, and the limit of telegraphic transmissoin under this condition is more than reached, because—and this is an important feature—in telegraphy an increase of current energy adds to the trouble instead of decreasing it, consequently the speed must be lessened or the line distance reduced.

In telephony, however, there is no apparent retardation in the transmission of telephonic impulses. This is proved by the fact that on any circuit over which it is possible to transmit speech, the words are complete and understandable, and not parts of words, no matter how rapidly they are spoken. The received messages may be exceedingly low and scarcely audible, even necessitating, possibly, the use of two receivers, nevertheless, no matter how low they may be, they can be understood until the resistance of distance is too great for the initial current energy employed at the transmitter. This shows "attenuation," which can be overcome in telephony by using a greater initial energy, as I shall prove later, but it does not show any trouble or inability to transmit speech, or any distortion of words, because of "retardation"; in fact, it proves that it does not exist, for the reason that all words received are clear, distinct and not distorted. All telephone transmitters to-day are limited in the amount of current in watts that they can carry and vary, and when this is exceeded, it is true, that on fairly long circuits, the received words are distorted, but this is the fault of the transmitter and not of the electrical conditions of the circuit.

That the limiting distance to which speech can be transmitted is not reached because of retardation is also proved by the fact that a cable, underground or submerged, of, say, fifty miles in length, can be operated over with a good telephone transmitter using two cells of battery giving a current of 1.8 watts in the primary circuit, while a transmitter using four cells of battery giving a current of three watts will work this fifty miles better, with more volume of tone at the receiver, and it will also work over a longer circuit. I have been present at tests made on an underground cable of 150 miles in length, where a standard telephone transmitter reached its commercial limit at fifty miles. Another transmitter, however, having a greater initial output, worked over the entire 150 miles of cable, the receiver reproducing the transmitted speech with such volume of tone that it was admitted by all present that the limit had not then been reached. What becomes of the retardation theory in these cases? Do they not signify that in telephony the increased initial energy overcomes the alleged detrimental effects of retardation and attenuation? Do they not prove that in telephonic transmission it is largely, if not entirely, a question of current energy? Admitting the advantage of the threee watts current over that of 1.8 watts, and the use of the increased initial energy on the 150 miles of cable, all of which can be proved and substantiated, the question arises, Where or what is the limit? May not the initial energy or current output be increased in proportion to the work to be done? This is practiced in telegraphy, in electric lighting, and in the use of power generally, whether it be trundling a handcart or pulling a freight train.

May it not also be possible in telephony to eliminate, modify or neutralize the detrimental static effects of a cable, so prejudicial to transmission in telegraphy? Why, then, should it be claimed that ocean cable telephony is impossible?

One of the most common arguments set forth against cable telephony and in support of these theories of retardation and attenuation as the limiting factors in telephonic transmission, is the well-known fact that there is retardation or a "time limit" in the transmission and receipt of a telegraphic impulse, under some conditions, which does govern the speed or number of impulses sent in a given time and limits the distance. From this, it is argued that the limit of distance in telephonic transmission over a cable must be materially reduced to that possible in telegraphy, because the telephone transmits so many more impulses for each word. This is absolutely an erroneous conclusion. As previously shown in reference to the 150-mile cable tests, the initial current energy determined the distance, irrespective of the number of impulses sent.

It is also a fact that a word of four, five or more letters is transmitted as quickly by telephone over any land line operated telegraphically direct, say, 500 or 1,000 miles, as a "Morse dot" transmitted by a manually operated key, and more quickly than a "dash."

This is an important fact, which seems to be overlooked by experts, but if seriously considered, I do not think it will be questioned, as it can be readily proved. It makes no difference, therefore, whether there may be ten or ten thousand impulses per telephonic word, as they are all transmitted and the word they electrically represent is received commercially, and so perfectly that the voice or timbre of the speaker is known, and this is accomplished in the same time, or thereabouts, required to transmit and receive a "dot," the smallest fraction of a telegraphic letter.

This proves that the greater number of electrical impulses sent in speech transmission as compared to telegraph transmission in no way affect or limit the distance, and that so far as the electrical difficulties, effects and conditions are concerned, on the basis of twenty-five words by telegraph per minute, at five letters per word and three impulses per letter, 375 impulses or "dots," we can transmit and receive 375 telephonic words per minute or as rapidly as it is possible to speak distinctly into a telephone transmitter.

Further proofs of the fallacy of the present generally accepted theories, has been furnished by tests over many circuits, including submarine cables from 60 to 400 miles in length, and over "artificial cables," among them being notably tests upon an artificial cable of the form constructed by Dr. Muirhead of London.

The Muirhead cable is a standard and used largely by ocean cable companies on their submarine cables for duplex work in balancing the circuit. In this application, it is claimed that it very closely represents the actual conditions of a submerged cable, and that the addition or subtraction of a few ohms, or a change in the capacity of a fraction of a microfarad, will throw the circuit out of balance.

This form of cable is also used as a standard from which to construct submarine cables, it being claimed that results obtained thereon very positively indicate what results will be obtained on a submerged cable of equal length.

It is very reasonable to calculate, therefore, that telephonic results over such artificial cable of a given length could be repeated over a similar submerged cable of same distance.

An artificial cable of this form having a resistatnce of 10,500 ohms and a capacity of about 570 microfarads, a K. R. of 6,000,000, equivalent to the K. R. of about 2,500 nautical miles of a submarine cable, was arranged in a most approved way for telephonic tests. The telephone transmitter and receiver were so far separated from each other that the speech of the person at the transmitter could not be heard or confused with that transmitted through the cable to the receiver.

Over this cable "speech was transmitted and received in a thoroughly satisfactory manner, the articulation being clear and distinct with a full volume of sound," as reported by a well-known electrical engineer and expert in charge of the tests.

The results of these tests, and others referred to, and the illustrations and proofs herein given, absolutely refute the arguments and theories against the transmission of speech over submarine cables because of the greater number of impulses or currents in telephony, the static effects of cables and the retardation and attenuation of the transmitted impulses.

From my experiences and observations, I am fully convinced that the first consideration in telephony is initial energy or current in watts in the primary circuit of the transmitter, and, secondly, due regard to means for the rapid discharge of the cable.

Inasmuch, therefore, as there is no apparent trouble in telephony, from retardation and attenuation, given a proper initial energy in proportion to the electrical work to be done, and no detrimental effects from the static conditions, means being provided for preventing same, and such means exist and are procurable without any change to the cables now in use, there are no known reasons why speech cannot be transmitted over submarine cables of the same length now used for telegraphing.

Further than this, I know of no reason, having a metallic circuit, or "twisted pair' in a cable conductor, why the metallic circuit cannot be used for the transmission of speech, and the two sides of the circuit be used separately for telegraph work, simultaneously, as now practiced upon long aerial lines, and I fully believe that this will be an accomplished fact in the near future.

CALIFORNIA AND THE TELEPHONE.

Writing of the telephone development in California, William E. Curtiss says:

"You can scarcely find a farmhouse that is not lighted by electricity, and few, even of the poorest farmers, would consent to live without a telephone. Down in the San Joaquin Valley ordinary barbed wire fences are used for the transmission of light as well as telephone service. They are connected with the regular wires upon the poles along the highways and with the houses and stables of fruit growers and farmers.

"Although the Californians are a pleasure-loving people and crowd the resorts and places of amusement, their time seems to be exceedingly valuable, and they are so occupied with both pleasure and work that they have introduced telephones into barber-shops and even into hotel dining-rooms. At the Hotel del Coronado, one of the largest and most popular resorts, where it is always June and where several hundred people are seeking rest and pleasure the twelve months round, there is a small white cable about as big as your little finger coiled up upon a stand near the entrance—long enough to reach any part of the room—which is one of the largest I have ever seen. A thousand people may be seated at dinner without the slightest crowding. The head waiter, who usually stands at the entrance, answers the ring, and in a low tone conducts a preliminary one-sided dialogue.

" 'Yes, sir, he is here eating dinner with some friends.'

" 'No; only just begun. His fish was served only a moment ago.'

" 'Yes, sir; I'll put him on the wire if you insist upon it, but he does not like to be disturbed at dinner,' and, taking the little receiver in his hand he goes across to the table of the guest who is wanted, with the white cable trailing along after him. Truly we are living in a busy world, and the strenuous life is found even at the pleasure resorts."

A barber at Paterson, N. J., has installed telephones in connection with the chairs at his establishment, so that his patrons can talk with their offices whilst being shaved.

CONVENTION PAPERS

THE RIGHT OF TERRITORY.

NO DEPARTMENT of the Independent telephone business in West Virginia needs the attention of the convention more than our rights of territory. The subject necessarily involves many conditions and subdivisions.

We might trace the rights of territory from the days of the wandering tribes of Israel, and from the King's chartered territorial grants down to the present day without throwing light on the subject as it affects the Independent telephone movement in West Virginia.

Years ago the Bell Telephone Company possessed the whole territory of the United States and Canada, but did not develop or occupy it. The large cities, towns and villages only were developed. Protected by patents of questionable issue it became arrogant, selfish, dominant and grew corpulent on the money filched from the public by extortion. The demands of the public for telephone service were not heeded.

Deprived of the greatest convenience of modern civilization, the people began to erect and build telephone lines and occupy the territory not developed by the Bell Telephone Company. Not until the

A. C. Davis.

Independent movement set in in earnest did the Bell company make any attempt to develop the unoccupied rural territory, and not until two million telephones were installed by Independent companies in the United States did the Bell company wake up. It still hears the echo from every city, town and village in West Virginia.

Since the Independent movement began in West Virginia it has been an unwritten law that unoccupied territory belonged to the company first on the ground, or first to make developments in the territory. It has many times occurred that the first company claimed possession of territory, or right of territory it did not develop. The company occupying adjoining territory frequently built over into territory claimed by the other; thus bringing about dissatisfaction and contention as to rights of territory. It may, therefore, be said that a company occupying a city, town or colony should have the right to keep and develop the adjacent territory. Failing to develop it should forfeit the right to occupy it. Which one from among the many neighboring companies should develop it? The answer is: the one which can best serve the community.

Wholly unoccupied territory is and should be considered open territory, and the first to make developments should by right keep it, but the first company entering territory does not always find itself in position to develop it or to serve the community. The territory may be isolated from its headquarters, or it may happen that the general trend of trade and commerce is not in line with its developments, but in an opposite direction, and that the community can be better served by the second company. Thus it occurs that the second company is induced to build into the same territory, and competition and rivalry immediately begin between the two companies.

Now don't deceive yourselves by this useless competition; there is not room enough or business enough in any town or community for two Independent telephone companies. Do you ask how these conditions can be solved? The solution is: divide up all territory occupied by two Independent companies; let the division give to each the territory that it can best serve. If the companies interested cannot agree, let them select arbitrators whose action shall be final—compensating the company losing the territory as may be agreed upon.

The Independent movement is of the people and for the people. They must stand together forming a coalition and union that cannot be shaken by the common enemy of Independent telephony. There is territory enough for you all and your rights to keep and develop it are safeguarded and protected by this association. You have no rights of territory that the Bell company respects; yet it is remarkable what it is now offering Independents in the way of sub-license contracts, and other schemes to make a breach in Independent territory.

To protect the territorial rights of its members, article 12 of the constitution was adopted, which is as follows: "No company, firm, corporation or individual engaged in telephone business in opposition to any member of this association shall be eligible to membership in this association, without the written consent of the member in whose territory said company may be operating. A member of this association shall not connect with or receive toll traffic from any company, firm, corporation or individual engaged in toll traffic in competition to other members of this association without the written consent of the member with which said company competes. A member violating this article shall be excluded from membership in this association or dealt with in such manner as may seem proper by the executive committee, or the association in annual session."

Let the old line companies stand together, shoulder to shoulder; let the spirit of give and take control your actions as to disputed territory. If for any cause you cannot develop the territory properly belonging to you, encourage the organization of a local company to develop it; giving a fair contract for connection with your exchange.

If you cannot interest local people to develop it, then arrange with your neighboring company to build the territory on a mutual contract for switching subscribers and the exchange of traffic. Be fair and honest with each other in the division of territory; protect your neighbor in all contracts for traffic connection and all contentions as to rights of territory will solve themselves. Encourage the occupying and development of new territory. Do not refuse to develop territory and then object when your neighbor does attempt to develop it.

There is yet much undeveloped teritory in West Virginia. Some of it is very valuable and productive; some of the mountain districts are sparsely settled and will not be productive for years, if ever. These sections of the state have been isolated from the larger operating companies; thus the territory has not been developed to any great extent.

When the business is backed by men who are true to the cause you will see every inch of unoccupied territory in West Virginia fully developed, and a business established that cannot be taken by a gigantic corporation which seeks, not by fair and honest competition, to destroy your business, but by falsehood, misrepresentation, and the power of wealth, to crush it.

Gentlemen, your state organization is backed by men who have devoted years of their lives to the business—men who have been tried and found true. The affairs of the Independents of West Virginia will be nurtured and protected by them. Have faith and confidence in your fellow associates in the development of your native state. Push! push! keep pushing! United we conquer; and, guided by the hand of past experience, Independent telephony will ride the rough waves of opposition; steer clear of the stormy capes of financial disaster, and enter a non-Bell port of commercial peace and prosperity where the rights of territory do not disturb us.—*Abstract of Paper read before the West Virginia Independent Telephone Association, Parkersburg, W. Va., February 23, 1906, by A. C. Davis.*

TELEPHONE REVENUES.

The evolution of the telephone has been so rapid that few have been able to keep pace with it. If you should ask an experienced telephone man the most important feature of the business he would tell you that it was the subject of rates. If you should ask him what phase of the business contributed most to its success he would certainly tell you that it was the efficiency of the service.

Generally speaking, "Telephone Revenues" can be derived from only two sources, namely, rentals, either on flat or measured service, and long-distance tolls. A uniform rate to be charged by the various companies out of the question, owing to the different conditions surrounding each station. Rates must be based on local surroundings. The reasons why service cannot be furnished uniformly to large and small cities are many. The population of the district to be supplied with service must be considered; also the

form of construction necessary, and the ultimate capacity of the plant, as well as many other questions which enter into the cost of operation of an exchange, and upon which a reasonable interest on the capital invested must be met.

The question of determining what should be considered an equitable rate, from the point of a given investment, is a proposition too indefinite to consider, but as the rates of every company represented by this association have already been determined a discussion of this phase of my subject is entirely unnecessary.

What interests us chiefly now is the question of methods of getting that which we are entitled to receive under the franchise, and ways of increasing the gross earnings without a corresponding increase in the operating account. In the first place, the selection of the subscriber is of great importance. It is upon him that you must rely for the major part of your income. His paying qualities should be well considered, the permanency of his location should be ascertained, the probable cost of getting a line to him and likewise its future maintenance. He should first be taught that the punctual payment of his account is an important obligation and that it is very much preferred that he pay it by sending a check, or by coming to the office in person. Considerable saving can be made even by a small company by insisting on the policy of subscribers paying their duties at the office. This custom allows a closer friendship to exist between the management and the subscriber and saves the expenses of collection. At Topeka we have adopted very stringent rules regarding payments and expect to continue to insist on their being observed. When subscribers become delinquent they should be notified at once, either by a statement or preferably by the bookkeeper calling them over the telephone. If they are able to give good reasons for their inability to meet their account it should be carefully noted; otherwise an urgent demand should be made for a prompt settlement. We accept the theory that a company can lose nothing from the enforcement of a very rigid policy covering the collection of accounts.

There is a growing tendency in the minds of a great many people to shirk them, on the theory that any franchise-holding company is reaping an abundance from the profits of its business. The chief duty of the telephone company is to furnish the best possible service; the subscriber's duty to the company is to pay his bills promptly and treat its employes, especially the operators, with consideration. Any telephone company makes its reputation largely as a result of the enforcement of these principles. The subscriber is a partner in your business. It is with him that you have to deal. Thus it will be seen how important a matter should be the choosing of this person.

Rentals should be paid in advance and any part unearned refunded if for sufficient reasons the patron cannot keep the service for the period paid. No installation should be accepted short of one year, for as a general rule, it cannot be handled with profit for a shorter period. The public generally has confused the idea of cheapness with the cost of telephone service. To it, an instrument connected with some wire attached to the nearest telephone pole constitutes the greatest cost of furnishing service. It has no conception of how these calls get to the central office, the method of giving connections, or the intricate and costly mechanism necessary to handle its business and the labor necessary to keep it in operation. It sees only the instrument on the wall and the wire connecting it to the pole line. It is a frequent occurrence for some prospective subscriber to say that his order was given some days ago and that you must be derelict in your business. When you attempt to explain the reason why the instrument has not been installed he generally paralyzes you with the absurd statement that: "The company has poles and wires in his alley and the only thing left to be done is the placing of the instrument." The general public little understands what a telephone exchange is, and the tremendous cost of equipping and maintaining it. This is a great reason why subscribers should understand in the beginning that punctual payment is the essence of his contract. Non-payment without a reasonable excuse should mean a prompt forfeiture of the service.

As to the revenues derived from toll-line service. The local exchange and the local toll-line company mutually link together. The exchange must have the toll lines to provide its subscribers with long-distance connections; it is equally essential for the toll-line company to have the exchange to supply its business. In the division of revenue between them, the idea of this common interest should prevail. In my mind there is no question but the equitable basis for arriving at a just division should be estimated on the amount of business originated by the exchange rather than on the basis of incoming and outgoing messages for the reason that the greatest expense to the exchange in handling toll mesasges comes from the necessity of making collections and accounting. Toll lines will never be any considerable source of profit to the average exchange company. The exchange must depend indirectly upon the prestige the toll lines afford as its source of profit.

Few Independent companies in the beginning were aware that to maintain a system it would cost more per telephone to operate, say, one thousand lines than five hundred lines, but they have since discovered when figuring operating expenses and after setting aside a safe amount to cover depreciation, that there is nothing left. Let us consider briefly some ways of increasing revenues without a corresponding increase in the investment and operating accounts. Telephone service should be graded to suit the peculiar needs of the people. We can find relief in the use of party lines which place the rates within the easy reach of a greater number of people. The rapidly increasing use of the telephone has made a demand for its service upon every class of business. The exchange should be in a position to supply all with telephone service without working a financial burden to any.

As an illustration of how this may be done I want to cite the situation at Topeka. Our single business line rate is $36 per year, while that of the single residence line is $30. We also furnish a rate of $2.50 per month by allowing two business houses whose location is in close proximity to be put on the same line, thus paying us $60 per year for practically the same investment as the single line for which we charge $36.

In the residence district we put four subscribers in the same block on one line and charge each subscriber an annual rental of $18, thus getting a gross income of $72 per line per annum. Our party lines are made up in blocks so that the line and pole construction is no greater than that of the individual lines and from which with the additional investment of three instruments and the labor of installing them we receive an additional revenue per line of $3.50 per month, or $42 per annum. For five hundred individual residence lines we would receive an annual income of $15,000, while for the same number of four-party lines we would receive $36,000 per annum, or a difference in gross income of $21,000 in favor of the party lines. The additional investment for installation does not exceed $2,000, so that this difference in income (which is $21,000), would need to pay a reasonable interest on the $15,000 additional investment, which at best could not be over ten per cent, or $1,500. This still leaves a balance of $19,500 to the good of the party line service. But the additional 1,500 telephones which have not added a dollar to the investment in switchboard, toll line, and cable equipment, have added additional burden on the operating forces over what the number of individual lines would be.

Yet, on our basis, we still have a possible balance of $19,500 on a given number of 500 lines to liquidate all charges from the operating, maintenance and accounting departments. We feel that our party line service fills every requirement of the average residence. Many of our most influential people, who are amply able to pay for any class of serivce desired, prefer to remain on a party line rather than pay the additional rate of $1 per month. In this class I can include a large majority of the bankers of our city, every minister (with one exception), many of Topeka's noted lawyers, and scores of our best business men. We have, I think, demonstrated with satisfaction that party lines under the enforcement of rigid rules as to time limit for conversation and general courteous treatment among the subscribers can be made a cheap and practical means of supplying service, and the principal source of profit to the investor.

Party lines are not the only means of increasing the revenues per line without a corresponding increase in the investment. An extension telephone at a rate of from 50 to 75 cents per month is an excellent and profitable investment to any exchange. The solicitor should be instructed to work this line of business, the value of which can readily be shown to the business man in saving time and many unnecessary steps. It allows him to answer calls promptly and many times permits him to dispense with business matters in less time than it would take him to reach the main telephone. Certainly no part of the business can show better profits than the rental of extension telephones at the customary rates. They can be made to overcome losses from unprofitable rates elsewhere.

Private branch exchanges for the large business institutions and pay stations for the use of the general public in the larger cities are also "revenue providers." I believe many of the smaller exchanges would find that public pay stations at convenient places for local and long-distance service would add materially to their collections.

I want to say here a few words about "dead-heads." Every exchange has this disagreeable business to a greater or less extent, and the tendency is ever to increase and never to diminish. The policy of donating service to favored classes and in lieu of special favors is a bad one and should be discouraged. There are few advantages to be gained and many disadvantages to overcome. Telephone service should be treated as any commodity. It should be purchased and paid for at its true value. There is no more reason why a telephone company should purchase its prestige through the means of "deadheading" than there is for a dry goods merchant or groceryman to give his goods away in order to court public favor. Success rests upon good service; it is the only means whereby substantial and lasting business can be built up; without it no amount of "deadheading" can perpetuate it and with it none is necessary. The subject of "deadheads" calls to mind the custom of "free service" between local exchanges. This policy injures the whole line in business and discourages investment along this line. Expediency may seem to justify this interchange of business in order to strengthen the exchange, but the sound wisdom of such a course is nevertheless questionable. The good effects resulting from these combinations are only temporary and are soon lost sight of. The

connecting lines are always overtaxed with useless calls so that legitimate business must be sidetracked. This condition is unsatisfactory to the greatest interests which are the main support of all exchanges. A reasonable charge can be easily maintained between local points, and should be for the good of the service as well as the financial benefits accruing.—*Paper read by W. P. Hemphill before Kansas Independent Telephone Convention at Wichita, January 27, 1906.*

THE CITY MANAGER AND THE FARMER.

The development and advancement in the Independent telephone business during the past few years has been truly phenomenal. I question if its equal has ever been seen in any other branch of commercial business. Hundreds of exchanges have been built in every state of the Union. Some of them in the largest business centers of the country. Thousands of miles of toll lines have been constructed and tens of thousands of telephones connected. This unprecedented growth and continued increase is very largely due to the fact that the Independent exchange manager throughout the land has given the farmer and farm lines the attention that they so long deserved.

The policy of our competitor has always been, until very recently, to ignore entirely the farming interest, or give them (at a very short distance from their exchanges) a very indifferent service, at such exorbitant rates that but few could afford the luxury of a telephone connection. They are beginning to realize, however, the great mistake they have made in this particular branch of the business, and are now bending every effort to placate the farmers and induce them to connect with their lines. Various propositions are being made, most of them well known to you. This matter requires close and constant attention and prompt action in each and every case called to your notice. The most to be feared at this time is the sub-licensee contract, which is very alluring, and the attempt that is being made to get their long-distance lines onto the switchboard or into the office of the local Independent companies, in towns in which they have no exchange. You are aware that it is no longer necessary to use a Bell instrument in order to be allowed to talk over Bell lines.

The majority of the Independent exchange managers early realized the necessity of connecting with the farming districts, and by this means strengthening the exchange, increasing the revenue and utility of the service, and thereby fortifying themselves against almost any attacks that might come. The mutual interest existing between the town merchant in all lines of trade, and farmer, make this connection a necessity.

The farmer, as rapidly as possible, was furnished with service at a moderate rate, being connected by party lines in most instances direct into the exchange and given exchange service. The growth was naturally somewhat slow, as you are aware that the unthought of increase in all exchanges demanded almost the entire attention and capital of those interested.

The average American farmer is progressive. He, more than most other men, is a social being, and in the progress and advancement of the present age, demands closer intercourse with his fellow men. He is no longer satisfied with his daily paper or magazine, but must be in close touch with the business world, to enable him to take quick advantage of favorable markets, and dispose of his produce before leaving home. The telephone brings him, as it were, into town. It enables him to reach his friends and physician without a moment's delay, and there are times in the life of one isolated as the farmer is, that make a telephone connection with town of untold value.

The farmer finds the telephone a great labor and time saver. One member of the neighborhood household will make a trip to town and return with supplies for them all; thus saving many a long drive and loss of valuable time. This is of particular value during the busy harvesting and threshing season, when the farmer must be enabled to quickly reach the implement men for repairs and supplies.

The service is also found to be of considerable advantage both to the farmer and postal authorities when used in connection with free rural mail delivery, as it often is. The daily weather reports are also of great value to the farming community and are furnished on call by many exchanges without expense to the farmers.

The farmers found the telephone of so great an advantage to themselves both in a social and business way, that they were unwilling to wait for the lines that were somewhat slow in reaching them, and commenced the building of farmer or mutual lines. Their construction work and connections were naturally crude and cheap; as cheap, in fact, as it was possible to make them, using small oak or native poles, set at long distances apart, without attention to guying and corners. The cheapest wire and instruments were purchased, and the single line so loaded down that it was practically out of the question to use them except for neighborhood talk. So great was their haste for telephone service that in some localities the barb wire fences surrounding the farms were used and considered by them at the time, all that was required. Switching stations were established in farm houses, and all went merrily on until the novelty had worn off, and the housewife began to tire of being called from her household duties to answer the telephone, and spend from ten to fifteen minutes making a connection for some distant party whom she frequently did not know and in whom she had no interest. This crude beginning, however, was a great educator, and as a result the farmer is no longer satisfied with poor instrument and indifferent service, but demands the best. The single grounded lines are rapidly being replaced by metallic circuits; old instruments by new, and the farm switching stations are being discontinued and the lines carried to some central point, a switchboard installed and a "switch-tender" employed.

There are two classes of farmer service; one who desire connection directly with the farmers in their neighborhood without city service except as toll, and those that care but little for the country, but want the advantage of the city exchange without the use of the toll service. The latter are generally those living within a few miles of the larger centers with which they do business. They care little for the rural connection except with their nearer neighbors, whom they can easily reach, as they generally have a similar service. He is the one in which the exchange manager at the present moment should be the most interested.

It is of vital importance that you should at once extend your lines into the country in every direction from your exchange, and connect all the farmers within reasonable distance with your switchboard, giving them as good service as you are giving your city subscribers.

If you have a central energy exchange, give them the benefit. Connect your lines so that you may ring grounded through tip and sleeve, or use one of the new and successful selective systems, thus reducing the annoyance of the rings on the line to the minimum. Ten-party central energy lines can in this manner be used with considerably less disturbance from the bells than the old style magneto four- and five-party lines. An exchange so surrounded will have become almost impenetrable. Close connection with all rural lines is of the utmost importance to the city exchange. The merchants expect and demand such connection, and will patronize the company that best serves them in this particular manner.

There is considerable talk of competition between the Independent companies and farmer mutual lines. Unfortunately in some locations this is true; the mutual companies have seen fit to establish exchanges and build lines in opposition to the Independent companies, making rates for service that are entirely too low to permit of good service and the proper maintenance of their lines, instruments and exchange. They parallel the existing Independent toll lines and give a very limited, unsatisfactory and indifferent service, sometimes forcing upon the public the necessity of three telephones, all because they were not allowed to talk unlimited distances without charge. In some instances these mutual companies are successful, but only where their rates are about as high as yours and when they charge a toll for toll-line talk. There is no question but that the farmer mutual companies are becoming a power in certain localities, but as a general proposition, they are true to the Independents, who made their existence possible.

One of the greatest difficulties with which we have to contend is the effort of the mutual companies to extend their lines from town to town, and switchboard to switchboard, over which they give free service. In some places toll lines have been paralleled with free lines, on which service is given to all those having a telephone, without charge. It is our purpose to connect with and serve these people, but they must not lose sight of the fact that we are furnishing the best of city service in all of the large towns, and have built and are building toll lines into the country in all directions in order to give them connection with the cities and disatnt points over copper metallic country, and that there must necessarily be a limit to free talk, as it is impossible to furnish something for nothing and do it permanently. Money invested in these lines must bring returns or the extension will stop.

Your city service is paid for in dollars and cents. If it is not satisfactory to the subscriber, not what it should be, or if the troubles are not removed promptly, the subscriber can complain and demand better service and more prompt attention. Not so with the mutual lines, where it is the business of everybody to keep the line up and make repairs, as a result of which the lines are out frequently for days at a time. You should recognize the fact that these mutual lines are, a majority of them, poorly constructed, and expensive to maintain. The careless work of one or two men in their building will affect the working of the entire system. The same is true in a general way of the switchboards, most of which were installed by the farmers themselves, and therefore the service cannot be good, and will not stand the test of time. These people will soon begin to look to you for better service, and by the time the lines are worn out or ready to be rebuilt the second or third time, the majority of the farmers will be willing and anxious to have the service furnished by people in the telephone business, who will construct good lines and furnish good service at a reasonable rate.

The farmer must be taught that in order to give good service, a reasonable income and profit must be allowed; that toll lines built

between towns must be respected; that their lines must end somewhere. Their management must be placed in the hands of persons conversant with the business and capable of handling it properly. The ideal condition of the farmer's mutual has not been reached, and will not be until some of the conditions suggested above have been brought about.

The "switch tenders" and some of the principals of mutual lines are demanding a percentage of the tolls for business passing to and from their lines. This is just under proper conditions. Whenever they have a "clear line" (as they call it) between two towns or stations giving a good service in connection with your toll lines, and not paralleling or competing with you, they should receive a commission or fee for switching and mileage. It is the duty of every Independent exchange manager to bind the farmers to them by bonds of friendship. Encourage their proper and sensible organizations. If necessary, identify yourselves with them. Get their good will. Give them all of the help possible by furnishing them the knowledge you may have of the business. Treat them fairly and honestly. Induce them to build more satisfactory lines and thereby improve your service as well as theirs. By such treatment you will be able to make a closer exchange arrangement with them, and give them a share of the tolls. If you can pay the expense of your additional help, without loss for a time, you will find that the general expansion of the service will soon work to your advantage and profit. If you oppose and antagonize them, refusing them proper and just treatment, you will find that their organization will grow and wax strong because of the feeling of resentment and independence for which the farmer is noted. So be friendly and just in all your dealings with them and you will find that you have struck the keynote in preventing "Bell tie-ups."—*Paper read by H. A. Douglas before the Northwestern Iowa Telephone Convention at Vinton, Iowa, February 13, 1906.*

THE IDEAL MANAGER.

There is perhaps no one subject connected with the whole telephone business upon which there might be such a diversity of opinion as the one assigned me.

This is occasioned by several reasons, among which may be mentioned geographical location, local environment and the conditions that obtain. No two exchanges are exactly alike, either in size or general conditions, and what would apply and be requisite in one case might not be necessary in another. Each manager is supposed to be trying to serve his patrons with the most prompt and efficient service at the minimum cost, and to maintain the balance on the right side of the ledger.

So while it would not be possible to define any specific rule for the management of an exchange, perhaps a few suggestions along general lines might be of interest, or at least serve to offer points for discussion, which are always instructive and beneficial. The value of a convention being the interchange of thought and the practical ideas brought out.

The larger the exchange, the more departments will be found necessary, but as West Virginia has but few of the larger plants, what I say shall be mostly from my own experience, and intended to be of value to the association.

No one can doubt the fact that the telephone exchange, as we find it to-day, is one of the most important business factors in this progressive age. The old adage, "Time changes and we change with it," is particularly emphasized here. A few years ago the telephone was regarded as a scientific toy, but what would the world at large do to-day if this creation of silk-covered wire, hard rubber and iron were eliminated?

The manager of a plant, say, of 1,000 subscribers, who should be a thoroughly practical man, is supposed to know how to install a station, and know when it is done properly, remedy an instrument trouble, locate and repair a trouble in his switchboard, and in an emergency don a pair of climbers, climb a pole and be able to do something when he gets there. The ability to make an accurate measure with the bridge, know how to open a cable, make a repair and wipe the joints when he has completed the work, are accomplishments, and renders such a man a valuable asset to any company. The cost of the various items that go to make up a plant, poles, wire, insulators, brackets, braces, arms, batteries, cords, hardware, instruments, etc., change frequently, and constant inspection of discount sheets is necessary if the manager would know where and how to buy. Eternal vigilance is the price of steady, economical growth, as well as of other things we have been advised of.

The manager, while at all times the head of the exchange, should have able, willing assistants, and their hearty co-operation is essential to the proper operation and maintenance of the plant. Frequent and regular consultations should be held, and plans and suggestions looking toward the betterment of the service discussed. Friction between the employes should be disapproved, and petty jealousies, which frequently appear should be promptly smothered. No partiality should be shown, but I have found that an operator or other employe, who constantly endeavors to make him or herself agreeable to everybody; who advances the company's interests should be commended. The annual vacation of at least a week on full pay, brings to the company an increased revenue in good will, appreciation and a desire to please. The finest system in the world, most up-to-date switchboard, modern instruments and all that goes to make up an exchange, amounts to nothing if the operating force is not in harmony.

The manager should keep posted in his business through the technical press—and we have some ably conducted periodicals—be able to discriminate between a practical appliance and a catch-penny invention, and be ever ready to give to his company the benefit of any new device for the betterment of the service, or the reduction of expenses. I would not suggest the frequent changing of apparatus or the addition of new makes of instruments, lest he soon find his exchange filled with a heterogeneous collection of instruments, which necessitates the expenditure of too great a sum in the way of duplicate parts. One, not more than two kinds of instruments at best, are all that should be used, and in this way a standardization of apparatus is possible—and this is a consummation devoutly to be wished.

The manager should not be so overloaded with duties that he be kept in the position of a clerk, but should have competent help, in a bookkeeper, collector, day and night chiefs, wire chief, inspector, and sufficient linemen to keep the construction work well in hand, as well as to keep the plant free from accumulated troubles. The chief operator who has charge of the operators, the wire chief who handles the switchboard inspectors and linemen, and the bookkeeper who looks after the collections must work in harmony with the manager, and be held responsible for the work in their several departments.

Thanks to our fearless Independent press, the true position occupied by the Bell company is now well known, and it deceives no one who reads. A battle is now on, between a company with years of experience and millions, and an indignant victimized people. This fight is to a finish, and nothing will be left undone on the Bell side to stifle competition, tie up a farmers' line or kill an exchange. Keep its actions in the past before the public, render the best possible service to your subscribers, ever striving to exceed past records, and you will eventually find that the Independent shield, that has never known defeat, with its colors recognized, loved and feared throughout the known world, will triumph.—*Paper read before the West Virginia Independent Telephone Association, Parkersburg, W. Va., February 23, 1906, by L. H. Hutchinson.*

HOW IMPORTANT IS A CLEARING HOUSE TO ANY ORGANIZATION.

The definition of clearing house according to Webster pre-supposes that its dealings are entirely financial. Your committee in selecting this name chose wisely. The only question which confronts the Iowa Independent man to-day is a financial one. Like the Iowa farmer after well cultivating his field and planting his crops, he halts for a moment as the grain ripens and contemplates how shall I proceed to garner in the fruit of my labor. What shall the harvest be? Let us for a moment glance at the report of the Bureau of the Census for 1902, and endeavor to comprehend if possible the magnitude of the long distance toll business as it relates to that feature, which is of the most importance to us. The total long distance and toll talks for the United States is enumerated as being 120,704,844 during the year 1902. The state of Pennsylvania having to her credit during this period 20,409,621; New York, 20,367,024; Indiana, 4,078,062; Iowa, 3,298,094.

Referring to table No. 36 of the before-mentioned census report, under the heading of the "Number of Public Exchanges, Bell and Independent Systems by States and Territories," we find that the state of Iowa is credited with 710 exchanges, 68 of which are Bell, 642 Independent. These figures as regards the total number of Independent exchanges are only exceeded by one other state, namely, Illinois and the ratio between the Independent and Bell is not exceeded by any other state in the union.

Referring to table No. 10, covering all systems—average number of messages, expense, and income per telephone by states and territories, 1902, we find that Iowa under the heading of "Operating Expenses" is reported, representing the lowest average per telephone per year, namely, $10.53, which is compared as follows: Illinois, $23.73; Pennsylvania, $28.91; New York, $39.79.

The fixed charges in these respective states are as follows:

Iowa	$1.15	per annum per telephone
Illinois	2.49	per annum per telephone
New York	4.66	per annum per telephone
Pennsylvania	4.94	per annum per telephone

The net income:

Iowa	$ 4.67	per annum per telephone
Illinois	8.39	per annum per telephone
New York	20.02	per annum per telephone
Pennsylvania	9.48	per annum per telephone

The conclusion is that we Iowans are putting more personal effort in the management and operation of our business than any similar organization in the states mentioned; that our investment per telephone is less; and that our income is the least. Does not this demonstrate that there is something radically wrong? Does this not confirm the statement that we are giving more for the

money than any other state? It has been conceded that our telephone rates for services per telephone are the lowest in the United States. Twenty-two per cent of the rural telephones of the entire United States are located in Iowa.

Taking the figures submitted to the executive council of Iowa for taxation purposes, we find that the total number of telephones reported for the year ending July 31, 1905, including the rural and farm telephones, aggregate 138,810, and our only competitor, the Bell, has reported 27,260. It may surprise you to know that the several Independent telephone companies of the state have reported 5,056.40 miles of copper wire, while the Bell company has reported 6,113.98. During the last eight months there has been considerable activity throughout the state in the development of toll lines. There having been a greater number of miles of copper toll lines constructed during the last eight months than during any two preceding years in the history of the Independent movement. Two exchanges of large capacities have been built, details of which are not included in the report from the executive council, before mentioned, namely, Sioux City and Council Bluffs, also the rebuilding of the Corn Belt company's exchange at Waterloo, which altogether represent an investment of $500,000 with an aggregate of 5,000 additional telephones. These exchanges all are constructed according to the most modern methods known to the art of telephone construction, both aerial and underground. The New State Telephone company, headquarters at Sioux City, has built upwards of 300 miles of number 10 copper toll line, which has opened up communication between twenty and twenty-five thousand Independent telephones, which were never before able to communicate with each other.

You may ask of what significance are these facts to the subject of this article, the clearing house. I answer that they are of vital importance, as they will enable you to comprehend the vast extent of the Independent telephone field. I also ask if the time is ripe for the inauguration of the clearing house, for the Independent telephone companies and will endeavor to assist you to correctly answer this question for yourselves by outlining a few of the benefits to be derived by your association with the clearing house. A survey of the methods to be pursued in the handling of your business should be brought to your attention.

Immediately after the inauguration of the National-Interstate Independent Telephone association, it was necessary for them to procure maps of all the Independent telephone lines throughout the country. This has been a very severe task. The clearing house desires to assist them in this matter to the extent of asking all Independent telephone companies of Iowa who have not yet furnished the national association with their maps to forward them to the clearing house at Des Moines. Arrangements are being made whereby all of the maps now in our possession shall be copied and forwarded to the National association.

The next important step as outlined by the National association is that of adopting standard forms of accounting, likewise, it has been the duty of the clearing house, which has already been perfected, the adoption of a standard toll ticket. The distinguishing feature of which is the exchange of the serial number which is printed on each ticket, "Out," "In," and "Through" between operators at the inception of a long distance connection. This feature when properly carried out and the record of the check number of the "Out" ticket having been made at the station called on the "In" ticket reduces the possibility of errors to a minimum, both in the amount of money received for the toll talk and the names and addresses of the parties against whom the toll is charged. It is hoped that the errors by the use of this system of tickets will be reduced below the average, which has in some cases been placed at 11 per cent, and if this is possible the expense of clearing these tickets through the clearing house will be greatly reduced in the future over the present method, as it may be possible, by dealing with the several summary reports from the several toll line companies to regard only the totals of the business exchanged between the respective companies.

A question naturally arises, Why is it that this system of toll accounting has not been adopted by other telephone toll line companies in the past? and I may answer that the peculiar circumstances governing the Independent telephone long distance messages up to date are radically different from the methods of other companies. For instance, a toll line conversation takes place between Des Moines and Sioux City, over the Independent line, at the present moment requires the use of several miles of copper toll line owned by several different telephone companies. For instance, Des Monies rings Ft. Dodge, Ft. Dodge rings Cherokee, and Cherokee rings Sioux City. Immediately there is a copper circuit electrically connected extending over a distance by circuitous route of 300 miles. There are four companies who have expended large sums of money toward the erection and maintenance of these lines and in order to justify the investment on the part of these several companies they must be assured beyond any question of doubt that they will receive each his pro-rata share of each toll charge from terminal point to terminal point. A talk between Des Moines and Sioux City will bring into the clearing house to be pro-rata the following tickets: an "Out" ticket from Des Moines, a "Through" ticket from Ft. Dodge, a "Through" ticket from Cherokee and "In" ticket from Sioux City. Each of these tickets will, with their presence in the clearing house, make a demand for its share of the toll charge and a comparison with each other by means of the serial numbers exchanged between operators will prove conclusively, if properly recorded, that the demand made by the ticket is a just one.

The following rules adopted by the clearing house will govern the handling of toll business:

On the reverse side of each "In," "Out" and "Through" toll ticket will be found explicit instructions to operators regarding the method to be pursued in recording each toll connection and disposition of tickets.

"1. Record every call before completing the connection, for failure to record any call through a fancied lack of time because of other calls waiting is as inexcusable as it would be for the clerk at a bargain counter to tell the proprietor, she was so busy handing out the goods that she could not take time to make out sales slips nor take in the cash. As the reason for the existence of the store is to get cash for its goods, so the only reason for a toll line connection is to get the cash or a record for the service rendered. Therefore, no excuse whatever can be accepted either from the sending or receiving operator for failure to record every call "In" to or "Out" from or "Through" her station, except as provided in rule No. 2.

"2. Calls offered from stations of some other company not using this system of toll tickets will be exempt from rule No. 1. Operators will be expected to bring to the notice of the clearing house all cases of this kind with as little delay as possible, but must give the other operator the number of her ticket either "In," "Out" or "Through" (being a receipt for the call).

"3. If either the sending operator or receiving operator should refuse to exchange ticket numbers, the operator who is willing to make the exchange of numbers necessary to the recording of the call will refuse to complete connection and as a matter of self-protection the operator who was willing to record the call will make known his or her attitude, and the facts of each case to the general office as promptly as possible.

"4. If the call cannot go through there need be no charges entered on the ticket, but the reason must be shown on blank space on ticket marked 'If not O K, why?' Each operator must inform the other operator so that the same notation will be on each ticket, both at station calling and station called. In case any call fails to go through for any reason whatever, each operator will mark a large 'X' across the face of both original and duplicate tickets.

"5. Before hiring a messenger, the operator at whose station a messenger is required must know beyond a doubt that the full amount to be paid out as messenger fee has been fully understood, authorized and protected by the operator at whose station same must be collected.

"6. All reversed calls must be marked on blank space between the serial numbers, at the top of each ticket in this manner, 'Rev.'"

The foregoing rules must be strictly observed by each operator and no excuse whatever will be accepted for violating same. We trust that each operator will appreciate the fact that a strict observance of each of these rules is necessary and the management respectfully solicits your hearty co-operation therewith.

The fact that each ticket is numbered, charged to the station at which place it is to be used and must be returned to the clearing house, whether used, mutilated or defaced, and that each call must be recorded upon a ticket at the instant an order is received for a connection to be made, guarantees a perfect record of all calls.

For instance, the total tickets used at an exchange for a given time are re-arranged in their original successive order, all being accounted for. We proceed to separate them into several groups, cash, charge, failed. We find that forty per cent are failed calls, thirty cash, thirty charge. This condition demands a careful analysis. Twenty per cent of the failed calls indicate that the line was busy as per notation thereon. A comparison of each ticket with the corresponding ticket which was placed in co-operation with it as shown by the number indicated on the blank space "Station called." Exchange between operators will assist by consulting the hour and minute at which the call was registered. When compared with other tickets from the station where call was arrested will show that there were no calls registered as being transacted bearing similar hour and minute. There is only one conclusion, the operator failed to put call through for reasons best known to herself, and as a result, these facts being known, the proper remedy being applied, you will find that the percentage of failed calls will be reduced. If the reason given are that forty per cent of the business registered failed to go through for the reason that the lines were actually busy and a comparison of all tickets in the manner before mentioned, results in corroborating the fact, what company is there who would not immediately prepare to furnish more line capacity; or operator capacity; or change his center checking system in such a manner as to double his receipts? If the average failed call was thirty cents and there were twenty calls, he could determine that he was losing $6.00 per day.

When standard rules governing the conversation of operators over the line are enforced the time consumed by operators exchang-

ing numbers over the line is not a disadvantage. You must understand that the time is fast approaching when orders will be placed for connections over very long distance lines "Morse;" each recording operator will be a telegraph operator. A citizen of Des Moines desiring to talk with a citizen of Chicago, the recording operator will put up the call "Morse" and when the party at Chicago is ready to talk, the Chicago operator will notify Des Moines "Morse," and the conversation will then take place. By the exchange of serial numbers in this case it will not be necessary for Chicago to notify Des Moines by a repetition of the names and addresses of each party (the present method) which consumes more time over a duplexed circuit, consequently there is every argument in favor of the exchange of numbers. By actual experience with the exchange of serial numbers, we find that the time occupied in properly registering the call reduces the necessity of unnecessary conversation between operators.

I am provided with sample tickets which will be furnished you if you desire them at the close of my remarks.

I will now endeavor to show you some of the results made possible from the compilation of data, only through the handling and grouping together of all tickets at the clearing house..

Referring again to the figures formerly quoted, namely, that the fixed charges for telephone service in Iowa are the lowest of any in the United States; and that the net income is also the lowest, there is but one natural conclusion, namely, that the Independent telephone companies in the state of Iowa are not securing into their treasuries all of the money which they earn and it is hoped that standard methods of accounting will accomplish the desired results and place the net income where it naturally belongs. I have in mind a statement made by a manager that his cash proceeds for toll line business during the first ten days in January were far in excess of the cash proceeds for the entire month of December and he accounted for it by saying that it had become generally known among his operators and managers that his company had entered the clearing house and that in the near future all interchanged long distance business would be handled in such a manner that the responsibility for each individual call could be definitely located, and it was his opinion that a preparation was being made whereby a large percentage of the cash toll business as being reported, so that when his system becomes fully under the control of the clearing house there would be no great discrepancy in the cash returns.

Another gentleman makes the statement that he owns and operates a copper metallic circuit extending out from an important center into a territory connected up with numerous other toll lines. The toll charge between where he takes on interchanged business to the principal center is fifty cents. He has been carefully considering the several features wherein the clearing house would either benefit or mitigate his proceeds; in order to satisfy himself on this question he has carefully compiled the reports covering messages between these two points. For a period of one month he finds that coming onto his lines from other lines were twenty-seven messages; he sent out from his point only six covering the same period. As a result several other companies have in their possession $13.50, while he received only $6.00 out of which he had to pay the terminal fee for switching of five cents for each message, both on the twenty-seven messages and the six messages and as he expressed himself very earnestly, it was his candid opinion that if he was able to make up a summary of all the business between these two points for the last three years, that there would be a net balance due his company in the neighborhood of $1,000.

There are several instances where one company may own a few miles of toll line which in connection with his neighbor forms a connecting link throughout this state. He has no working agreement regulating his switching charges with any other companies, but has the privilege of switching all these through connections and furnished service to all messages, which terminate at his point, without receiving any compensation whatever for his investment or his labors performed. His affiliation with the clearing house will thereby secure for him the amount he is entitled to for each and every message.

The adoption of standard rules governing the transmitting of toll messages will greatly increase the efficiency of toll lines now in operation which are very much congested on account of the unnecessary conversation between operators in securing through connections, and it is safe to assert that while a large percentage of the business offered to these lines is rejected on account of "line being busy," the adoption and carrying out of standard regulations will not only improve the service but make it possible to furnish service to all applicants without the expense of building another circuit. There are important places where connecting links of a few miles of copper line will greatly improve the present existing lines and exchanges, but persons are withholding the necessary investment to accomplish this, for the reason that they never before had been assured that they would secure any returns for the messages coming over these lines, if they were built. These objections are readily dispelled on account of the organization of the clearing house, which has been perfected after several months of preliminary work carried on by the following gentlemen, who are the present officers and board of directors: C. C. Deering, P. C. Holdoegel, J. M. Plaister, Chas. G. Cockerill, E. H. Martin.

The first annual meeting of the stockholders was held March 12 and adjourned to meet March 14, at which time an election of a board of directors for the ensuing year took place. This was considered expedient to enable all those companies who have recently come into the clearing house to participate in the election. It is to be hoped that each person, whether official stockholder or employe of the several Independent telephone companies visiting this convention will avail himself of the opportunity to pay a visit to the clearing house and learn more of the details thereof.

In conclusion your hearty co-operation is respectfully solicited to make this organization what it should be, a help to every Independent telephone company in the state of Iowa.—*Paper read by George T. Hewes before the Iowa Telephone Association at Des Moines, March 14, 1906.*

TELEPHONE MONOPOLY BILL IN CONNECTICUT.

Owing to the nearness of the closing hour and my desire to let those from out of the city register their opposition to the bill, I gave way to them on Thursday last without finishing my argument.

You will remember I showed you that the bill as drawn would create a monopoly, that the courts of Connecticut have held that "public necessity and convenience" did not exist when the Bell company was in the field to supply their wants. Also showed you another judge had held that under the section the same as embodied in section 8 of the bill before you, that it was necessary to summons the monopoly in any hearing or trial.

I want to call your attention to that part of the evidence of the president of the Southern New England (Bell) Telephone Company. In speaking of the application of the Farmington Valley Telephone Company applying for the right to erect poles, under a law similar to the one you have before you, he testified: "They (the Farmington Valley) drew their application, and as the Southern New England Telephone Company was not in the territory particularly described they did not cite us until they presented their application to the court. The court *refused* to hear the application until they had served upon the Southern New England Telephone Company a proper citation. That was done. What they asked for was permission to set poles in the town of New Hartford within certain limits on a certain highway or narrow strip of land. We found that it did not *interfere* with us. We *consented* to the decree and the decree was passed, so they are in that part of the town without any question."

In other words, in Connecticut the Southern New England Telephone Company of the Bell Trust is greater than its creator, the state of Connecticut, and such will be the case in this commonwealth if you pass the bill before you.

These decisions are the only ones on record and stand to-day as a precedent and as a living monument of how easy it is to get an objectionable law on the statute books and how hard it is to get it off.

I have shown you if this bill should become a law it would protect or benefit no one but the monopoly that is a foreign corporation and does not pay a tax in this state on its capitalization, and I would like to ask this committee if you are willing to drive the Independent telephone companies in this state, operating under Massachusetts charters and whose citizens have invested their money in good faith in the securities of Independent companies, out of business and turn the territory of this commonwealth over to this foreign corporation? Are you going to use the laws of this state to throttle a demand of the people for telephone competition? Is this in accordance with a right guaranteed us under the constitution of this commonwealth? You gentlemen of the committee may have acquired a competency by close attention to your different lines of calling, but are you going to fasten upon your children and your children's children a law that will prevent them from making a living in a business that has gotten to be a necessity of life?

I have shown you by figures, bank letters and maps where the Independent telephone companies have met the Bell monopoly in competition. The Independents, in leading cities as well as in rural districts, have passed the Bell companies in number of subscribers and the people have received the benefits of competition.

Seeing the advances made by the Independents, some weak-kneed money grabbers are afraid competition will hurt the securities of the Bell monopoly. Do you know they were protected by the patent laws for more than seventeen years? Do you realize if the bill before you becomes a law you will be perpetuating their patents that expired some years ago? Do you know that under more than seventeen years of patent protection the monopoly obtained less than 250,000 subscribers, whereas, under ten years of competition they have increased the number of telephones to 2,300,000? Did the coming of the Postal Telegraph affect the securities of the Western Union? Did not the public receive the benefits of competition, and who is there among you that would say the coming of the Postal Telegraph has proven detrimental to this state? Do the trolley express systems in operation in so many different parts of this commonwealth affect the securities of the Adams Express Company? No, gentlemen, they have not, and in the telephone business

as in other lines, it can and will be regulated by supply and demand. Pay no attention to this argument of protecting the securities of this foreign corporation, the Bell monopoly.

I remember in my younger days, before the patents on sewing machines expired, paying $100 for a sewing machine, the same that can be bought now for $25. Who among you would now favor the passing of a law giving the original patentees the exclusive right to manufacture and sell sewing machines in this commonwealth, and although a competing sewing machine manufacturer could sell a better machine for one-fourth the money, would say, you must show that "public necessity and convenience" exist for the competing machines, when you have a court decision saying when the original patentees are in the market to supply the demand, such necessity does not exist, no matter if the Independent macihne is cheaper. Do you want to over-ride the patent laws of the United States and create a monopoly by preventing competition in the telephone business?

In my talk last Thursday I showed you the Independents construct more economically, and the fixed charges (interest on capitalization and bonded indebtedness) is one-third that of the monopoly and maintenance and operating expenses do not exceed one-half of that incurred by the monopoly.

Understand, we do not say we are going to run the Bell company out of business any more than the Postal Telegraph has run the Western Union out. On the contrary, the trend of my whole argument is, while the Bell may have to reduce its rates and improve its service, such action would bring it many new subscribers and the people of this commonwealth will be benefited thereby—the increased business will more than offset the reduction in rates, which can only be forced by active competition.

Will this committee tell me, with the telephone trust practically on a 4 per cent basis, and straining every nerve to earn its dividend rate, how by supervision you can force them to reduce their rates and thereby cripple their service?

You go to the office of the telephone trust and they will show you by their books that each call over the telephone costs them one and three-fourths cents, so if they have twenty-five calls a day over an unlimited service rate business telephone, they are losing money. In other words, on every telephone in the office of newspapers, bankers, brokers, hospitals, etc., or anywhere, when they have the unlimited service rate that makes twenty-five calls a day or more, they are losing money. By their books they will show you that the expense of conducting their business is about $49.00 a telephone and receipts $51.00 (figures of January, 1903), so when they only receive $18.00 a year from the farmer for his telephone they are losing $31.00 on such contract. How can you force reduction in rates by law when such facts exist and they can prove it by their books. You may ask, then, how do they maintain their dividend rate. It is by their long-distance calls, a good part of which is interstate, that cannot be regulated by this commonwealth, but only by the acts of congress.

The monopoly will show you they have reduced their rates, which is computed by their system of averages, so if a man in Boston pays $150.00 for a private wire unlimited service business telephone and has two desk telephones attached thereto in his office, by the books of this trust they show the rate has been reduced to $56.66 per station, although the man's telephone bill has increased from $150 to $170. You cannot take their property away from them, nor reduce their rates below a fixed price that will permit them to earn a fair return on capital, and, gentlemen, always remember this is a foreign corporation you must deal with. You will find by competition, and competition alone, you can get the desired results, which, if you stand for the bill before you now, you threaten to destroy.

My understanding is when the New England Telephone & Telegraph Company went to New York some years ago to obtain its charter it capitalized at between $10,000,000 and $11,000,000. Of this amount it gave to the parent Bell company (the American Telephone & Telegraph Company), which it could do under the New York law, but not under the conservative Massachusetts law, $6,000,000, upon which its subscribers are paying $360,000 a year in dividends, which in ten years would amount to $3,600,000; its capitalization being now $25,000,000 and about $3,000,000 of bonds in addition—what proportion is water I don't know.

Q.—You say, Mr. Lyon, your business is that of selling telephone securities. Have you ever sold the Bell securities?

I have not, why should I sell the Bell securities that are only paying 4 per cent on par, when I can give my friends a better Independent telephone company stock that pays 8 per cent?

In addition to this, the monopoly, who alone will be benefited by the passage of this bill, during the life of its patents owned and controlled by the parent Bell company, paid an exorbitant rental on every telephone and drop in the switchboard use, which, however, through competition by Independent companies, has caused the parent company to reduce its rental to four and one-half per cent of the gross receipts. In other words, the business man in Boston who is paying $150.00 a year for his telephone, has the satisfaction of knowing that he is paying tribute to the parent Bell company $6.75 yearly for the use of its transmitter and receiver, when the actual cost of same is less than $3.50. How is this for a usurious rate of interest?

I have not the latest annual statement of the New England Telephone & Telegraph Company by me, but I am told that this yearly rental and royalty (as they express it) exceeds $300,000 per annum. Add this to the $360,000 a year interest on excessive capitalization, and we have the tremendous sum of $660,000 that the subscribers of its system pay to the parent company each year for patents that have expired years ago. Can you not see why their rates are excessive?

Remember, gentlemen, this contract must go on forever until the parent Bell company sees fit to reduce the same, which can be accomplished only by competition, that the bill before you will have the tendency to destroy. One thing I do know, speaking for the citizens of this commonwealth, the monopoly have all but emptied our pocketbooks and now they are after our hides, that is, will be, if this bill becomes a law.

The people of these United States have been aroused within the last twelve months by the showing up of high financiers and trust methods until it seems to me that whoever is responsible for the wording of this bill, particularly section 8, is like a man saturated with gasoline, only needing a spark of indignation to consume him, and when the public become aroused to the true meaning and monopolistic tendency of this bill he will meet the fate of the moth in the flame and can blame no one but himself.

Q.—Don't you know that the attorney-general drew this bill?

I did not; he is entitled to his opinion, but in my opinion and in the opinion of a large majority of the voters of this state, whoever drew the bill showed very poor judgment.

This bill, gentlemen, particularly section 8, in the light of experience, should have no standing among men who are sworn to represent the interests of the people. I know the governor has recommended the supervision of telephone and telegraph companies, but I am sure he was not the author of the bill. I am also sure he was not familiar with the experience of Connecticut in a similar law and his suggestion of supervision was without the knowledge of facts as explained to you by Representative Ward, Ex-Senator Newall and others.

I have shown you the state grange, with a membership of over 10,000, the Business Men's Association, with a membership of 5,000, Pomological Society, the landlords and taxpayers, the Connecticut Federation of Labor, with a membership of over 20,000, aggregating 75,000 voters, all of Connecticut, nearly one-half the vote of the state, have declared the law, similar to the one you now have before you for consideration, was obnoxious and against the people's interest, and I would like to ask who there is among you that would like to face similar opposition next November?

Is this commonwealth willing to go into partnership without emoluments, with an octopus who is paying their taxes on capitalization to a foreign state, a corporation that from the time of its inception has wrenched every dollar possible from the public?

In appearing here, I do so as a citizen, not that I have any grievance against the monopoly—personally, every man that I am acquainted with connected with it are fine fellows, but as a corporation it is greedy. No one can blame it for taking all it can get, but I ask the privilege for myself and associates of the right to make a living in this line of business, if I am able, which would be denied me under the bill before you, and I ask the rejection of the bill now under consideration.—*An address delivered by Mr. Robert P. Lyon on the "Telephone Monopoly Bill" before the Committee on Mercantile Affairs at the State Capitol in Boston, Mass., March 13, 1906.*

SOME PHASES OF RURAL TELEPHONY.

Rural telephones and small town exchanges, practically unknown during the life of the exclusive Bell patents, sprang up all over the country with marvelous rapidity upon the introduction of Independent makes. And while the larger town and city exchanges were operated upon a business basis, the rural and small town systems were mostly mutual. They having to deal with an entirely different class of people, who largely use the telephone for a different purpose, and requiring a different class of service and management, were at first in a way ignored by many of the larger companies who asked exorbitant prices if connections were allowed at all. This is where they made a mistake, for it caused dissatisfaction and often an ill feeling toward the larger companies, who have found these feeders or small branches absolutely essential to the best success of the larger exchanges. Much trouble has also arisen between patrons and the management on account of misunderstandings between them and mistreatment by the employes. Farmers as a class are a peculiar people with which to deal, their independence and remote positions making it all the harder, and our success depends on our ability to get and keep close to them.

It is needless to enumerate the difficulties that have come up, as we are all more or less familiar with them, but the question before us is how to overcome these difficulties to the best advantage. The country telephone systems are almost as different from the large city exchange as two different businesses, therefore the all-around telephone man must make a close study of both conditions.

Rural telephony is naturally divided into two separate classes, namely, the mutuals, or lines owned and operated by the farmers on a mutual basis, and the company lines, where the farmers pay a yearly rental for their telephones and lines. In many places the two classes are operated together in the same local system, and we will discuss them as under these conditions.

Where a company is renting telephones and operating toll lines to any extent it is necessary that they should also operate the central office in order to look after the best interests of their patrons. Then the first question asked by our mutual friend is the price which he will have to pay for switching and connections, and the territory to which this charge will give him free access, etc.

Many companies have been unfortunate in that they started with too low a switching rate, which in many cases would not even pay expenses, say nothing of interest on the money invested and depreciation. It is almost impossible to raise this rate without much dissatisfaction among a certain class of people, who immediately jump to the conclusion that they are the victims of a monopoly, which will soon own them soul and body, if they don't take matters in their own hands.

Most farmers are reasonable and fair if they know that they have a square deal. So we must first know where we are and what we can do, explain the situation, expenses, etc. If an agreement is reached make the contract in black and white and stand by it, and see that it is understood by the people in general and not just by those with whom we are dealing. This is very important and may save much trouble later. The employes hold an important position regarding our relations with the public.

A cross or discourteous operator will undo much work of the best managers, while a pleasant and interested operator or lineman, with the proper word of explanation, may right a wrong opinion and make our best customer. Such employes should be given due credit.

Farmers generally oppose paying tolls and advocate blank lines from one town to another, with free and unlimited service. But in reality if they can talk to their own town and near adjoining towns they have very little use for the longer lines, and I believe that I am safe in saying that the toll business of the farmers as a class will not average forty cents per year each. Now we will consider a new phase of the question where the farmers have a central in competition with ours. Let us offer to take their mutual lines into our centrals at a fair switching rate which will include service to the near adjoining small towns, allowing the farmers to connect their blank lines to our board and wherever they have exchanges, we to switch their message thereon free of charge. These lines to be maintained by the farmers. This would appear fair to them but the free territory included in the switching rate would cover their requirements in so near all cases that few blank lines would be built, and the few that were would not reduce our income by the loss of tolls in comparison with the switching fees that we would lose if half or all the mutuals were cut off.

Some will no doubt disagree with me as to making a switching rate that will include service to the near adjoining small towns, advocating measured service as the best. This is truly the ideal service in its place, but a careful study of the rural telephone situation shows that the farmers will not stand for a certain fee for every message, but want unlimited service to certain points. It is not likely that all the farmers adjoining a town will use the lines much in every direction, but some will talk almost exclusively in one direction, while others will talk to those living in another direction. But it is necessary to make all the same rate, and the service will be divided in most directions about alike. It looks too easy for the farmers to build their own lines to these nearby points and get this free service if we do not provide for it. We have our pole leads, and it is inexpensive to maintain a blank wire from one central to another for this local business only, sending all paid messages over the regular toll lines.

If we have a call for connections with a mutual switch in adjoining territory where we have no toll connections, we can offer them free service to our exchange over their line in exchange for connections for our wires free. Our system may be slightly the largest, but we better have the connection with them if possible. It means more tolls for us, less strife and competition, and less liability for them to work further into our territory, and our patrons will also be better satisfied.

There are hardly any two localities where the same rule will apply, but I have endeavored to make the illustration as near common with the most places as possible. The prime object should be to get all the local lines on the same switchboard, this gives us toll outlets for messages that originate elsewhere on our system, and there is sure to be some toll business from every line that has connections.

The same question arises to a certain extent among the users of our rented telephones, as among the mutuals but not as universal, as the renters are usually given county service and unless they live near the edge of the county this meets practically all their wants, but we have a much more difficult proposition with those living near the county lines who generally want about the same radius of territory which cannot very well be granted. But they are certainly entitled to their nearest neighbors, whether on one system or another, even though they may live four or six miles in the other county. I know of one place where the farmers are paying $1.00 per month for their telephones, and cannot talk to their neighbors and relatives living as close as one to three and four miles without paying toll and going twenty miles around. This is not right and they are justly demanding a change and the companies concerned should see that they get it. Most companies can meet such conditions either through their present centrals with wires especially for it, or through a switch which some of the patrons are willing to operate for the free use of their telephones. These country switches are unsatisfactory to the telephone companies in many cases, but if they satisfy the patrons their good will more than offset the inconvenience where the work cannot be taken care of at the centrals.

The matter of maintenance and collections is an important one, and the more so on account of the remote situation of many rural lines. Many people wait to be called upon before paying their bills, others are careless or nearly always away from home when we call, or may not have the money just at the time. So we have to mail them statements and wait until they get ready or think of it, and possibly we will have to make a drive to get the year's business closed by January 1st. Would it not be policy to offer a certain discount, say five per cent on all yearly payments that were made during the month of January for the following year? This would amount to a reduction of sixty cents per year in the rentals, but would it not be worth it? We would not only have the yearly payment in advance to be using during the year, but it would make a material difference in the bookkeeping work and we would virtually have a contract for the year. It is also an established fact that when an article is paid for it gives better satisfaction than otherwise, and if the telephone rent were paid one year in advance there would be less complaint from those who are in the habit of kicking.

Some collecting can be done when we are looking after trouble on the lines, but in the majority of cases when there is trouble one place there is in another, and we do not have time for extra stopping. There would be some who would not take advantage of the discount, which would have to be collected throughout the year. But if you stop to look after a telephone and then collect for it there is a feeling that you came for the money and not through an interest in the proper working of the telephone.

I have heard people whose telephones were working all right complain that no one had been to look after them for over two years, they having put in new batteries when needed. The patron had the idea that we were only after the money and cared nothing for them or the service. Local managers should make it a point to see every telephone on their system once or twice a year. If it is working all right and we do nothing for it, our patrons will feel that we have an interest in them, and we will be well paid for the trouble, for it is the satisfied customers that keep a business going.

Many times we will find that a telephone has been working bad for some time and if reported at all, we did not hear of it, and other times we will find loose connections or other trouble, unnoticed in the service, but which is sure to show up later on, and may be the cause of our having to hire a team and make a special trip. When trouble is reported we should not delay in repairing it—such promptness is one of our best advertisements. The best telephones should be installed on the remote ends of the lines. A few sets of batteries should be taken along when in the country to replace old ones, even though only two-thirds gone they will talk poor if not so already. These old batteries can be used to advantage on the pole changer for ringing, and where seventy-five or more telephones are in service no new batteries should be put on the pole changer, as the new ones will give so much better results on the transmitters, and any number can be put on the ringing circuit. A battery gauge or tester is a necessity however in order that the ringing batteries may be frequently tested and removed when exhausted. Different kinds of ground connections are used. A wire properly connected to a pump probably makes the best ground excepting a water works system, but the fact that pumps have to be taken up for repairs once or twice a year makes their use impractical, as hardly one farmer in a dozen will properly connect wires after the pump has been replaced. An eight or nine foot pump rod makes ample ground in most cases, but it is necessary that the connecting wire be better attached than merely twisting around the rod. Soldering is the most satisfactory as the wire will rust sooner when fastened between two nuts on the end of the rod. Nothing smaller than a No. 14 galvanized wire should be used, as the smaller wires break off too easily. The cost of these rods is near thirty cents, but if bought by wholesale would be about one-fourth cheaper. These rods can be kept on hand ready to use at any time and when used that part of your installation will be first-class. I have driven six miles to fix a telephone when only the ground wire needed to be properly attached to the pump which had just been out for repairs. The expense of that trip would pay for several ground rods, to say nothing of the inconvenience to which it may have put your subscriber.

Much trouble and expense can be saved by the careful and

proper handling of the wire. The presence of a small piece or ring of tie wire left on the line wire would not seem to do much harm, but the vibration of the line wire makes these ringlets cut the line little by little, so that it will break sooner or later. So it is better to cut the line wire if necessary, and make a splice rather than leave the ringlets and make a drive later to fix it. Many linemen in making ties twist the tie closely around the line wire two or three times and cut it off short, making it almost impossible to remove it. It should be strung out more and an inch of the end left and bent to the glass. The closely wrapped connection is particularly wrong in connecting drops or branch lines as the close twists mostly do not clamp the wire tight, thereby making a poor connection, and it is impossible to remove it, while if the twists are spread out two or three rounds to the inch for six or eight inches, the whole connection can be removed for testing or other purpose, leaving the line wire intact.

If we are to keep apace with the times our old telephones must be supplied with condensers, and new ones bought with them already installed. But equally important is the pulsating attachment on the generators for calling central. These can be bought very reasonable on the new telephones and attachments are now being sold which can be attached to the old generators with but little trouble. Now we come to the most simple part of it all, but none the less important. It is the relay made of the regular ringer movement, which when properly attached at the central will keep the local rings from throwing the drop, but when the button is pressed giving a pulsating current, the drop will operate in the usual way. This is a satisfaction to the subscribers and a great help to the operators, and also so inexpensive that no company can afford to be without them. —*Paper read by E. H. Sidwell before the Northwestern Iowa Telephone Convention at Vinton, Iowa, February* 13, 1906.

EXPERIENCES OF A TELEPHONE MANAGER.

I will first try to give you two points which our friend, Mr. Walker, from Iowa Falls, tells me he intended to speak about but forgot. First, he wants me to speak of the clearing house. The clearing house proposes to take care of the accounting of the toll business which we have heard so much about to-day. Heretofore in handling toll business between two companies the custom seems to have been "get all you can and can all you get." That is, each company originates as much business as possible, collecting such rates as it sees fit to adopt and keeps all it collects. The clearing house proposes to establish uniform rules and equitable arrangements so that these transactions between the companies may be handled in a manner similar to the handling of like business between companies engaged in other lines of service; and the clearing house will arrange for the correct settlement of balances between the various companies monthly. I think it is of importance to every company to participate in this work of the clearing house association. Be a member and have a voice in all affairs.

The other matter that I have been asked by Mr. Walker to speak of is the state association which meets on the 13th of March in Des Moines. You are all invited. Some of you have attended in the past and know something of the nature of these association meetings.

I was supposed to have written a paper to be read this afternoon on the subject, "Experiences of a Telephone Manager," but I have been so busy getting the experiences that I have had no time to write the paper. Therefore you will have to listen to the little I may be able to say extemporaneously.

One of my most recent experiences occurred immediately after leaving this city last week. I had been asked by the board of supervisors of a neighboring county to meet them at the county seat of their county. They wanted telephones in their court house and they seemed very well satisfied that ours was the service they preferred; but one member had a letter from a competing telephone company in which that company asked permission to install telephones and render service at a much lower rate than I had named.

I was convinced that they preferred our service, but that they thought that I should meet the rate named by the competing company. I met this difficulty by asking them whether they desired to have the service rendered at less than cost; and upon being assured by one of their number that they did not expect service for less than cost of operation and reasonable profit on investment, I told them I would trust to their judgment as to whether or not the rate named was reasonable; and that after they had satisfied themselves on that point, they could name their own rate for the service, rather than that I should be asked to compete with the terms named by the competing company, whose rates they knew were named for the purpose of making the business unprofitable and with the ultimate view of destroying competition so that the said competing company might thereafter enjoy a monopoly and recoup by means of higher rates—the loss temporarily sustained during the period of cut rates. The supervisors saw the point and decided they could not afford to take the attitude of demanding "something for nothing."

I believe that is one of the things that is being made prominent to-day. We cannot unite or be associated together as local companies except on the basis of square dealing.

Another experience: In one of our daily papers I saw recently an article that had been copied from a Vinton paper in which an announcement of this meeting was made, and in which the idea seemed to be conveyed that I would be present and would be expected to answer almost any question that might arise. I was very much alarmed at first, because I did not know what I would do about the many perplexing questions that I was sure would arise. But I remembered having attended a state convention in Des Moines two years ago in which a man from Vinton made a speech that so pleased the convention and aroused so much enthusiasm that I felt sure that if I got into trouble by reason of questions asked, I could just refer you to Mr. King and he could answer them. I am glad he is with us and glad I got acquainted with him. I believe he has the right idea concerning many of these matters that we are considering.

I will not take up your time very long, but I do believe that I should give you the word that I use as often as the word "boost" is used by our friend from Iowa Falls. My word is "unite." The one experience that seems the most important to me is a sort of a sum total of all the experiences I have had during the short time that I have been working in the telephone field is this—a realization of the fact that the telephone business is different from any other business under the sun. I do not know whether that is fully realized by all gentlemen present, but the one great company against which all mutuals and Independents are contending, is right when it argues that there should be but one system. I am not sure, however, that they are right when they argue that theirs is the only system that is to triumph. It seems to me ours is the system that is to be "IT."

There are some difficulties to be overcome in order that our mutual and Independent telephone movement may triumph. The greatest difficulty is our inability to see alike concerning the solution of matters of mutual concern. If you ask how this difficulty is to be overcome, I can only answer that I believe mankind in general is inclined to be reasonable. But in order to be reasonable, man must reason, and reasoning requires time, and sometimes it takes so much time for this reasoning that some person or some company dies while the reasoning is being done. Nevertheless, the most important object to be sought by each one in the telephone business is that of trying to satisfactorily define the meaning of these words "fair dealing" or "the square deal."

There is a difference of opinion as to what fair dealing means in almost all lines of business; and it comes out more strongly in our particular case because the telephone business is one in which you cannot use either the scales of weight or the tape line to measure the product. Neither can we agree to having a universal flat rate such as is now in use for postal service. Because you would not pay as much for toll message to Mt. Auburn as it would be necessary to charge for a message to Manilla, but we are willing to pay the same postage rate to Mt. Auburn as we pay to the Philippine Islands since the islands have come into the United States. It is difficult to agree concerning what is fair, but I know that we will come to an agreement concerning these things more quickly by holding meetings like this than we would by staying apart and thinking ugly things about each other and each other's ways of doing business. Therefore, I believe you will agree with me when I say that the only way to overcome existing difficulties between Mutual-Independent local companies is to get together and talk over these difficulties with the honest intention and desire of overcoming them and this is the only thing in which we are in marked contrast to the company against which the Independent movement is contending. They will not allow us to hold district or state or national conventions, and at the same time be a member of their system.

If the Independent movement succeeds it will be because of the proper direction given to united efforts by these conventions or by the conventions of some similar organizations. Even if we should take the attitude that there is a division between the mutual and Independent people it seems to me we must still look at it in this way—if the existing associations or organizations are wrong, we must try to make them right and we cannot make them right except as we work in and through them. Therefore, I say again, "Band together, unite, and work together in such a way that we will come to see these things alike if possible."

We must come to an agreement as to what is just and fair. If we could not agree, we would be somewhat like the old man who was unable to agree with his church and therefore started a new denomination, later he could not agree with the new organization and again separated himself from that, finally he withdrew from his home church with only himself, wife and his children banded together religiously; and later excommunicated his own children. About this time his former pastor paid him a visit and the pastor remarked to his former parishioner that he must have perfect peace of mind now that he was disassociated from every one except his wife, and therefore could feel that he was not encumbered by any association with unbelievers; but the parishioner made quick reply, "I am not yet satisfied because I have doubts about Mary Ann."

We are all apt to think that personally we are right. Might there not be a possibility that the other fellow is right also?—*Paper read by J. H. Shoemaker before the Northeastern Iowa Telephone Convention at Vinton, Iowa, February 13, 1906.*

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EDITORIAL DEPARTMENT

LOOK FOR THE SHIELD.

MR. R. A. Walker of Iowa in an address before the recent Northwestern Iowa Telephone convention, calls attention to the Independent telephone emblem in these words, "That we Independents may know one another we'll use the shield. The National-Interstate Telephone Association has been organized to look after our interests as a national body and have sent out as our unity cry, 'Look for the Shield.' Put the shield on your signs, letter heads, envelopes, cards and wear a shield button on the lapel of your coat. Let every Independent letephone man wear a shield —talk shield and think shield. 'Look for the Shield' and work for the cause the shield represents. If you see an Independent without the shield, ask him why he does not wear it. It is our emblem and stands for our cause."

This is the sentiment that has made the Independent movement successful against one of the greatest trusts this country has ever known. All Independent telephone men should use the shield in every way possible, so that when one looks for the shield it will be there.

MR. CARTY'S INSTITUTE PAPER.

MR. J. J. CARTY'S American Institute paper concerning telephone engineering, which we print in full in this issue, is a masterly statement by a master of his art. Mr. Carty has been connected with the Bell telephone interests almost from the beginning of things, and represents in some degree the first generation of telephone men. His present standing in the profession is the highest. His mental attitude always has been that of requiring the sanest, exactest and most methodical gathering of pertinent facts, and the simplest and clearest methods of reasoning from them to the desired conclusions.

His writings always have been remarkable because of their great clearness and wonderfully convincing power. Like many another master of the writing art, he has the habit and sometimes-dangerous faculty, of so carrying his reader as to forestall objection until the reading has been done, and sometimes to leave him lulled in a state of acquiescence not wholly warranted by the conditions.

Most thought and discussion upon the message-rate versus the flat-rate system of charging for telephone service has been directed to the justice of the systems in financial ways. Mr. Carty makes clearer than any preceding writer the importance of the reactions upon the service which come about when changes are made in the method of charging. It is beyond doubt that his observations and conclusions are unassailable, in that the new reactions of the message rate system tend to increase advantages and diminish disadvantages.

Among the other important phases of thought which Mr. Carty's article presents, to which most careful consideration is invited, is that of interdependence of executive, traffic, construction and engineering departments. Truly, this is a matter which is of less relative advantage in small plants than in great ones, but "principles are undying," and the mutual relations of such activities persist even to the smallest units.

IOWA TELEPHONE NEWS GATHERING AGENCY.

THE Iowa Independent Telephone Association formulated a plan to organize a press bureau to gather and disseminate the news of Iowa in much the same manner as does the Associated Press. The organization will be perfected at once and the service will start within a few weeks. The organization will be made up of the larger Independent telephone companies of the state which have extensive toll service.

All of the news is to come into the office of the Independent telephone clearing house in Des Moines, where it is to be sent out with respect to the territory which will be particularly interested. The lines to the larger towns of the state may be equipped for telegraph service, which will require but little expense, and the news telegraphed out from the Des Moines office when necessary. A telegraph message can be sent over a wire at the same time the wire

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is being used for telephone messages without interfering with either message. The news is to be gathered by the toll operators in the larger toll stations of the state.

This arrangement grew out of the demand of the Iowa Evening Press Association, made up of the larger evening daily newspapers of the state, to secure more state news. A committee from this association met with the telephone men, committees were appointed by each and the general plan worked out.

While the new arrangement is planned to serve more especially the evening papers, it will be offered to the morning papers as quickly as the arrangement can be perfected. The Independent lines now cover almost all of the state.

SCARCITY OF TELEPHONE POLES.

MAN finds that if he would live well and comfortably he must be careful and thoughtful. Just now he is finding out in this country that he must extend his care and thought to the increase of the life of telegraph and telephone poles. How important this problem is, is indicated by the fact that there are 800,000 miles of telephone and telegraph lines in this country, requiring 32,000,000 poles. The present life of each pole is so short that they must be renewed approximately four times before trees suitable to take their places can be grown. A pole lasts in service about twelve years, on the average, but is made from a tree about sixty years old. In other words, to maintain a continuous supply five times as many trees must be growing in the forest as there are poles in use. The severity of this drain upon forest resources by the telephone and telegraph companies is obvious enough. Just as in the case of railroad ties, the question of pole supply has thrust itself into prominence. To lengthen the life of poles, and in this way to moderate the demand and conserve future supplies, has become an important matter, affecting the public as well as private interests. So the forestry bureau of our benevolent and beneficent government is going to study the question. It will experiment with trees cut at different periods of the year and treated with preservatives of various kinds in order to ascertain under what conditions poles will maintain their usefulness the greatest length of time.

THE FARMER'S TELEPHONE.

THE agricultural interest of a country are pre-eminent. Prosperity on the farm is prosperity in the town. The season of good crops is the season in which all trades and industries realize activity and profit. Before the manufacturers can work up to full capacity, they must have supplies of the raw material which comes from the farming sections; before the distillers can attain an extended output, the corn, the rye or the fruit must have been grown and harvested and brought in from hillside and valley. The wool, the cotton, the lumber, the sugar cane, the wheat, come from the farm lands to the closing and housing and feeding of the multitudes in the cities and the towns. "God made the country and man made the town," and having been made first it is only just that it hold first and most vital place in the economics of the world. All these products brought to the market, the agriculturist receives the ready equivalent in the money which will buy for him the conveniences, luxuries and necessities made possible by the skill and inventive genius of this advanced and strenuous time. Is it any wonder that the first thought at such time with the farmers is the acquisition of that combination of convenience, luxury and necessity, telephone service? This service now becomes available to the farmers in most sections, and is a veritable boon, making isolation a condition unknown, bringing the means of protection to all, and keeping hillside and woodland and valley in talking area. The sheep fold can call up the woolen mill, the man of the rye or the wheat or the corn field can learn in a minute the prices prevailing in the market town, or if some of his good money be invested in stocks and bonds, he can find out whether to instruct his bankers to buy or sell. Then for the tender consideration of life. If one of the family be ill, the good doctor can be consulted or called instantly; a friendly gossip and exchange of information with neighbors may be indulged in; and John at his desk in the city can call up Jennie out on the farm and tell her that he loves her even better than he did when he left her yesterday. Indeed this farmers' telephone service is a wonderful factor in the onward march of progress. It will of necessity aid in the development of new sections of farming territory, and soon an overflow from the too crowded towns will spread out to make blossom like the rose the millions of acres of God's own country, sending back as they locate a message over the telephone wires to those they have left behind.

THE CHICAGO BELL'S DEFEAT.

THE Chicago (Bell) Telephone company has been conducting its business for many years with no regard to the rights of the city of Chicago or its subscribers. It has been charging $175 per year for service that its franchise plainly states must be furnished for $125 per year. It has been charging toll within the corporate limits of Chicago with no legal right so to do. The people could not be expected to stand for this treatment always, so a suit was brought for restitution of moneys wrongfully collected and to compel the company to live up to the conditions of its franchise. Mr. Henry Barrett Chamberlin in the March issue of the Voter tells of how the company was brought to a realization of its position. The story is so well told that we republish it in full:

Having been caught with the goods, the Chicago Telephone Company has paid into the treasury of the city of Chicago $200,000 and promises to make a full accounting for compensation long past due just as soon as the amount can be ascertained. But the Chicago Telephone Company is not entitled to any applause because of its action. It has paid this money in order to pacify the people it has robbed and wronged for many years. It is seeking a new franchise and it is attempting to create favorable public sentiment by professions of honesty and decency. It is neither honest nor decent, and if the council of Chicago is not swayed by sentiment or something else it will see to it that this incorporated extortioner receives exact justice and no favor. Between men there is still a standard of business honesty, but the rule cannot apply when the city of Chicago is dealing with the Chicago Telephone Company. The experience of the past should be the guide for action in the future and any contract entered into with this shameless robber ought to be safeguarded, nailed down and constantly watched. If any corporation can find a way to beat the game the Chicago Telephone Company may be relied upon to be that same.

After a long fight the company has received a trifle of the reckoning which it has invited for years and which should be increased a hundred per cent. The Supreme Court of Illinois has denied its contentions, ruled against its excessive rates and the robbery of unjust tolls and ordered that it pay compensation. For the citizens of Chicago the victory is sweeping, and if the officials charged with representing the people will do their duty intelligently, the advantage will not be lost. Chicago appears to be in a position to forfeit the charter of the company. It ought to do it, but as this is unlikely it should at least compel restitution of the moneys which the company has stolen from its subscribers in the past and compel it to hereafter perform adequate service at an approximately fair rate. It is perhaps too much to expect an entire square deal on the part of this company.

Stripped of legal verbiage, the decision of the Illinois Supreme Court means that Chicago is in position to forfeit the charter of the Chicago Telephone Company, or, in other words, to forfeit the privileges and licenses granted to the compnay in the public streets of Chicago by the city ordinance of January 4, 1889, or to oust the company from certain powers it had usurped of charging illegal telephone rates. The court unequivocally declares that the practice of the company in charging rates in excess of those prescribed by the ordinance is wholly illegal. The supreme court, by its decision that the rates fixed by the ordinance cannot be exceeded upon the pretext that it is furnishing special service, also disposes of the claim of the company that it can impose toll charges upon persons who are paying the maximum telephone rentals prescribed by the ordinance. It is perfectly clear under the decision that whatever additional territory was annexed to Chicago and a telephone system maintained therein, any subscriber elsewhere in the

city who was paying the maximum rates for telephone service established by the ordinance was entitled to communication with anyone in the new territory without payment of a toll charge. To get right down to the language of the plain people, the Supreme Court of Illinois means to say that the Chicago Telephone Company has been operating a series of grafting, hold-up and confidence game and should be invited to skidoo.

The legal representative of the city who is entitled to the credit for the sweeping victory, who has made good on every point of the controversy which has been pending between it and the Chicago Telephone Company during the past two years, is Maclay Hoyne, assistant corporation counsel. He it is who has had charge of this litigation on behalf of the municipality and who has deftly slipped the legal harpoon into the eminent counsel of the telephone company in such a way as to make them profess to like it. His conduct of the controversy for the city has been admirable, and he is entitled to the thanks of his fellow citizens for his able and successful efforts in their behalf.

TO REGULATE TELEPHONES IN BRITISH COLUMBIA.

IT MAY be interesting to learn of proposed legislation in British Columbia for the regulation of telephone companies in that province. A bill has been introduced in the legislature which gives to every person, association or company operating a telephone line the right to connect with the line of any public company, and such public company is to be obliged to receive and transmit messages from any connecting line in the same manner in all respects and with the same rights and liabilities as in the case of messages received by the public company in the regular course of its business.

Provision is made for rents to be paid to and the rates to be charged by the public company for the use of its lines by these private connecting lines, such rates to be fixed by the government in unincorporated districts and by the municipal councils in incorporated districts at their pleasure.

It is further provided that every public company shall annually submit to the government a schedule of its rents and rates and that these must have the approval of the government before being put into effect. Provision is made for penalties in case of failure to comply with the law and for mandatory injunctions to enforce compliance.

The bill is brief and to the point. There is no excessive verbiage affording legal loopholes for evasions. It is, in fact, a measure meant to conserve the interests of the public in a public utility, and seems to deal with an important matter in a way that will work out satisfactorily to the people, while inflicting no injustice on the telephone company.

INSTRUCTS JURY OVER TELEPHONE.

THE use of a telephone by a judge in his home to direct a jury in a courthouse nine miles away in the intelligent use of different forms of blank verdicts, while possibly open to grave objections, is held not to affect their verdict, according to an opinion recently handed down by the full bench of the Massachusetts Supreme Court in the case of John R. Whitney et al. as trustees vs. The Commonwealth of Massachusetts.

The suit was for land damages. Judge Bishop gave the jury different forms of issues to decide and instructing them in their use sent them out.

As they had not agreed at the hour of adjournment of court for the day the judge left word with the court officer in charge of the jury to let him know by telephone if they did not understand the use of the blanks. During the evening the court officer called up the judge by telephone at his home in Newton, which was nine miles from the courthouse at East Cambridge, where the jury was in deliberation, and told him that they were in difficulty about the meaning of each of the forms, but had otherwise agreed upon a verdict.

Having satisfied himself that this was the only difficulty, the judge instructed the court officer to escort the jury into the office of the county treasurer, where the telephone was located, and with no one else present but the court officer the judge instructed the jury through its foreman over the telephone in the use of the blanks.

The plaintiffs claimed that this invalidated the verdict, but the Supreme Court holds that no miscarriage of justice resulted, inasmuch as the communication did not relate to the substance of the verdict itself, although the court intimates there are grave objections to any communications with a jury by telephone.

INVESTIGATING THE NEW YORK BELL.

THE Board of Aldermen in New York recently passed a resolution calling for an investigation of the New York (Bell) Telephone Company, its charges and ways of doing business. The resolution in substance is as follows:

Whereas, The telephone system in the city of New York is operated and controlled by one corporation, without competition, and under circumstances that enable said corporation to charge exorbitant rates and impose arbitrary conditions for furnishing such service, whereby not only our citizens but also our city government is made to suffer financially; therefore, be it

Resolved, That our Committee on Laws and Legislation be instructed to hold a public hearing on these charges and to investigate and report on the condition of the telephone service in this city; the method of charging subscribers for calls and the reasonableness of the rates charged for such service, and also to report on the powers of this board to control said matters with a view to the betterment thereof, and for the purpose of relieving this city and its citizens from the effects of a monopolized control of such telephone service, and all other matters relating thereto; and be it further

Resolved, That said committee report to this board thereon with all convenient speed.

The investigators will discover that the New York Telephone Company has been charging exorbitant prices for its service. It will further discover that the solution of the telephone problem in New York City is competition, and the sooner an Independent company is permitted to furnish service on Manhattan Island the better the telephone users of New York City will be served.

TWO ATLANTIC MONTHLY ARTICLES.

THE Atlantic Monthly, in the November issue of last year, included a rather remarkable article by a Mr. Coburn, entitled "Telephone Development in the United States." Its appearance excited a considerable amount of comment, most of it unfavorable. The article was characterized throughout by a pronounced bias in favor of the Bell company, its practices and its methods, both of to-day and of the past. Much of the surprise which followed was because the article appeared in the Atlantic Monthly, a staid, dignified and usually academic publication. But it is published in Boston. Other portions of surprise were due to the distortion of mind in which the writer of the article found himself at the time he produced it.

While we did not see our way clear to reproduce the Coburn article at length, we gave it editorial notice to the extent of a page or so, selecting the more remarkable paragraphs for comment. We agreed with all others who had read the article and expressed themselves concerning it, that its character was such that it would do no harm to those at all informed about the telephone business, while at the same time it was such that it might mislead others whose interest had caused them to acquire but little knowledge about it.

It appears that the Atlantic Monthly received a large number of letters from its readers, making more or less unanimous protest against its action in publishing such an article. Mainly these came from the middle and western states, as that is the region in which the most accurate and valuable information about the business so far exists. The general tenor of the letters, so far as we can learn, was a protest against the Coburn article in that it emphasized too strongly the advantages of a single centralized control of

the telephone business in the United States. Mr. Coburn's theme seemed to be based generally on these thoughts: "The telephone business is a natural monopoly; it cannot reach its fullest development unless in a given nation it is controlled by a single interest; the Mohammedan says 'Allah is Allah and Mohammed is his prophet.' We say 'business is business, and the telephone end of it is ours'; the Independent movement cumbers the earth and the people's money is being wasted."

In the February issue of the Atlantic Monthly editorial dignity is unbent sufficiently for a correspondent to be asked to write concerning the telephone movement from another point of view. As the editors state a correspondent has been asked "to put the case for the Independent telephone companies." The correspondent in question was Mr. Jesse W. Weik, and in recognition of the value of his effort and in order to give his writing a much wider circulation among telephone people than it secured by appearing in the Atlantic Monthly, we reproduced it in full in the February issue of TELEPHONY.

Mr. Weik's article gave space to three general phases of the telephone movement, three-fourths of it being confined to a historical treatment of the invention and perfection of the telephone instrument itself. In an examination of the respective efforts of Bourseul, Reis, Bell, Gray, Drawbaugh and Berliner, Mr. Weik is inclined to give chief and primary credit to Bourseul, and final credit for actual perfection to Daniel Drawbaugh of Eberly's Mills, Pennsylvania.

The remaining quarter of the article is divided about equally in the discussion of the development of Independent exchanges and lines and of the finances of Independent operators. We somewhat regret that Mr. Weik has not taken occasion to make something of an analysis of the validity of Mr. Coburn's arguments.

Fairly viewed, of course, it matters very little just what opinion an isolated individual may have relative to the divine right of the Bell company, or any other corporation, to the exclusive control of the telephone business in this country. Like the situation of Mr. Baer and the anthracite coal deposits, the divine right claims have had no more effect than to amuse the American public by giving Mr. Dooley a happy inspiration of conversation with Mr. Hennessey.

But most of us feel that the iniquity, if there is one, in the anthracite coal and Standard Oil situations, is not in the claim that the things in the earth are peculiar and sacred property. It is in the further-reaching processes by which the public at large is discouraged from having its own fair way, because in most instances, little or big, it would be entirely too much trouble to prevent or circumvent the obstructing processes of the monopoly.

One of the strongest agencies of every controlling corporation or group of corporations in this country is that of its bureau of publicity. The business of such a bureau is to give selected matter the widest possible publicity, at the same time shrouding its origin in the greatest possible secrecy. By reason of its wide scatterment of representatives, the Bell company, or any other like it, is able to collect and distribute its "news matter" with an effectiveness against which nothing but reasonable alertness and American common sense can be satisfactorily operative.

We have no fault to find with Mr. Weik's article, and our only grief is that he were not more strongly inclined to take up the cudgel for Independent telephony by attacking Mr. Coburn's statements. Roughly speaking, the Coburn article was made up of two ingredients: platitudes and fallacies. The platitudes would hurt nobody, but the fallacies might deceive the innocent.

It is just now the fashion to air industrial and commercial controversies in the popular magazines, and we may expect after the Coburn opening, that the telephone press bureau will be active through that medium. We have, therefore, this fervent word: Every time a recognizable bit of inspired fallacy appears, let the correspondents of the middle West repeat their spontaneous performance.

NEW USE FOR TELEPHONE.

LEGISLATORS have been accustomed for a number of years to have certain of their constituents point to Massachusetts as a state many of whose laws might be copied with advantage. They have been told that no state has insurance laws like Massachusetts. More recently and even now they are being urged to adopt the form of ballot which Massachusetts has provided. Whether these same men would be willing to follow Massachusetts in all of her methods of transacting business is another question.

Billerica is a town in that state of something less than 3,000 population. In the form of her government she has what is known as a Board of Selectmen. Recently a meeting of that board was to be held. It was the last meeting of the board and so an important one. But there was a severe storm raging, so severe that many of the members could not venture from their homes. In fact, two of the members were snowed in. The chairman of the board happened to have a telephone in his house and another member of the board was a very near neighbor of his.

The brilliant thought occurred to the chairman to call up the town hall, and learning that both the clerk and the other member of the board were in attendance awaiting the arrival of the detained members, he suggested that the board's business might be transacted by telephone, and so an arrangement was made with the telephone company by which the parties were connected each with a separate instruments. Reports were read, appointments made, election officers designated, warrants drawn—in fact, all the important business of the closing meeting of the Board of Selectmen of this important town in Massachusetts was transacted over the "hello" instrument.

Surely a new use for the telephone.

THE CANADIAN TELEPHONE BILL.

NOT the least important of the measures to come before the Canadian Dominion Parliament this session is the telephone bill. The Bell Telephone Company desires power to increase its capital stock from $10,000,000 to $50,000,000. It is understood that only a portion of the new capital will be needed at once, but it is desired to have the privilege of issuing stock from time to time as the extension of the business demands.

In view of the present relations of the company with the municipalities where it does business we should think there would be strong opposition to the bill. Moreover, in these days, as a rule, a tighter hand is kept on the corporations than the terms of this legislation would permit. It has been deemed wise by parliamentarians in Canada to give no such extensive capitalizing power. If the money is needed at once there would be a chance of the application succeeding, but we fancy the best the Bell people can do will be to get what they really need this year. They will be told to come back when they want more. This, we believe, would be the common-sense way of dealing with the bill.

The Bell Telephone Company in Canada is in the same position as the Bell companies in the United States. It needs money not so much to take care of extensions and improvements as to try to crush competition which is an expensive and altogether unsuccessful plan.

TELEPHONE PATENTS ISSUED IN 1905.

A PATENT every day for the year 1905 is the telephone record. During the last year there were issued three hundred and sixty-five patents for inventions relating to telephony, or an average of one daily. This represents thirty per cent increase over the year 1904, and nearly 100 per cent increase over 1903.

DIGEST OF TELEPHONE PATENTS

By Edward E. Clement

812,841. Telephone Memoranda Attachment; B. F. Gilbert. This is a telephone directory attached to the transmitter by clamping under the mouthpiece. A pair of metal parallel plates have cards alphabetically arranged pivoted between them, each card having a tag projecting out beyond the edge of the plate or cover so that it can be turned up in the clear to read the names. When released it falls by gravity.

812,954. Annunciator Drop; C. E. Scribner. This is an annunciator having a drop shutter and two magnets controlling it, each magnet with a polarized armature carrying a rod and hook to engage the shutter. One hook is normally in engagement and the other pulled into engagement when its armature is attracted. Direct current will lift the first hook without pulling down the second, but alternating current will vibrate the hooks out of step, so that one or the other will constantly engage the shutter and hold it up. Only direct current will operate the shutter therefore. Patent assigned to the Western Electric Co.

812,980. Self-soldering Heat Cartridge and Protective Apparatus; Frank B. Cook. This is a heat cartridge having metal end caps and a central spindle projecting at one end or the other, this spindle including a resistance body such as graphite or carbon and being soldered to the caps. When a cartridge operate the line-circuit is grounded without opening, which Mr. Cook states to be very satisfactory. There are seventeen claims, and the application was filed in November, 1904.

813,230. Service Meter for Telephone Exchanges; F. R. McBerty and E. B. Craft. This is a telephone meter or register for the subscriber's station. The subscriber presses a button, which latches, holding the circuit closed for signaling central, and including a polarized magnet controlling the latch, and also in one direction controlling the register wheel. If the operator gets the desired connection current of one polarity releases the button and registers. If not, current of the other polarity releases the button but does not register. Patent assigned to the Western Electric Company.

813,330. Telephone System; R. Sherer. This invention is intended to prevent eavesdropping or listening in, relating particularly to a party-line lockout system. A step-by-step vertical movement controlled by a magnet is provided at each station, the talking contacts being differently positioned at the various stations so that only one will be in circuit at a time. Patent unassigned.

813,538. Connector for Electrical Conductors; F. J. Troll, This is a double sleeve connector through which the wires are thrust and then twisted. The distinguishing feature lies in the enlarged ends, which receive the insulation on the wires. Patent unassigned.

813,560. Telephone System for Central Stations; G. Lambert. This is a German, and his specification is hard to read. A subscriber has a calling key, and at the central station his line is multiplied to different switchboard divisions and has a step-by-step selective device whereby he can light the lamp at any one of these divisions. Patent unassigned.

813,931. Annunciator; J. A. Wotton. This has a pair of magnets with projecting front poles and a "Z" shaped central pivoted armature carrying a circular target with alternate black and white segments adapted to be turned behind similarly shaped openings in the face plate when the magnet is energized. Patent unassigned.

814,118. Telephone System; W. W. Dean. This is one of the many two wire multiple circuits produced by Mr. Dean for the Kellogg company. It relates particularly to a test cord and plug for grounding the tip side of the jack so as to light the line-lamp. One claim specifies an operator's outfit in connection with said test cord. Patent assigned to Kellogg Switchboard & Supply Company.

814,219. Automatic Telephonic Installation; B. Kugelmann. This gentleman also resides in Germany. His invention is an automatic system employing a common calling circuit at the central office and Thomson bridges with sensitive relays in connection with his mechanical switching devices. As he depends upon balancing resistances, his system appears to be hardly dependable enough to be practical.

814,276. Attachment for Telephone Toll Boxes; R. M. Combs. This is a tube for holding coins vertically over a toll box like that employed by the Chicago Telephone Company. A spider at one side when turned shoves out the bottom coin and drops it into the chute. The side of the tube is provided with a row of sight openings, so that the height of the pile of coins may be seen at any time. The supposition is that the guaranteed amount for the month is placed in the tube at the beginning thereof, and after that the subscriber can observe the diminishing pile. Patent unassigned.

814,277. Switch Key; E. B. Craft. This is a key having a "U"-shaped stamped frame, a flat face-plate and contact springs mounted down both sides of the "U" frame, through the middle of which the plunger works. Patent assigned to the Western Electric Company.

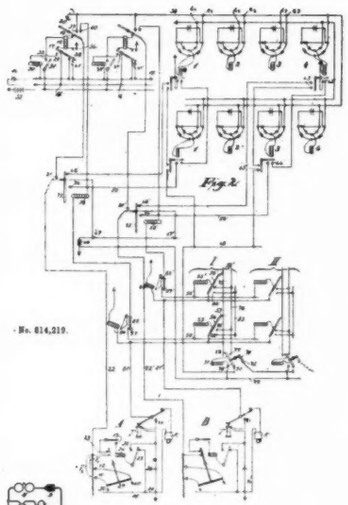
814,386. Telephone Exchange; W. M. Marean. This is a signal device whereby the subscriber can set up the number wanted in front of the operator instead of telling her the number. Broadly the scheme is old, and the claims are more or less limited. Patent unassigned.

814,411. Telephonic Relay; J. Trowbridge. Like most relays, this involves the use of a receiver and a resistance button or transmitter operated thereby. Communication is through an intervening layer of air in more or less free communication with the surrounding atmosphere. Patent unassigned.

814,478. Telephone or Telegraph System; G. Ritter. Mr. Ritter is from Stuttgart, Germany, and he says in connecting several telephone subscribers a cut-off is needed for a party-line, which will cut off or lock out all but the person calling or called. For this purpose he uses relays in a special circuit. Patent unassigned.

814,571. Telephone System; E. A. Terpening. This is a party-line system wherein the parties can call each other without calling central and can call either one of two central stations without disturbing the other or each other. A very sensitive annunciator is provided at central, and an arrangement is furnished whereby parties on one side of a line can call those on the other side by switching over. Distinction is made by using alternating and direct current and the two sides of line. Patent unassigned.

814,680. Telephone Attachment; E. Ehrlich. An attachment for mouthpieces having a pad of paper sheets with a central opening and gauze covering the opening which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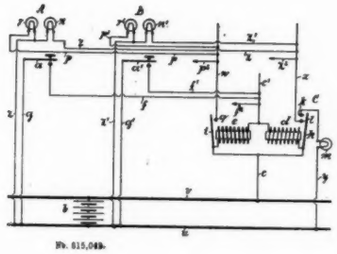
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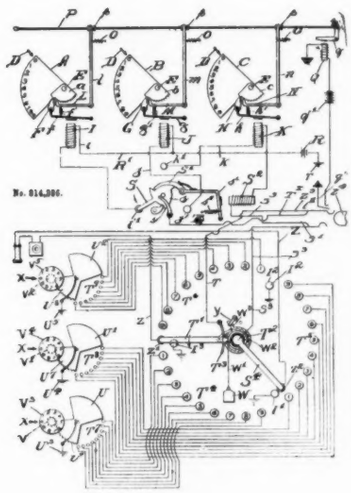
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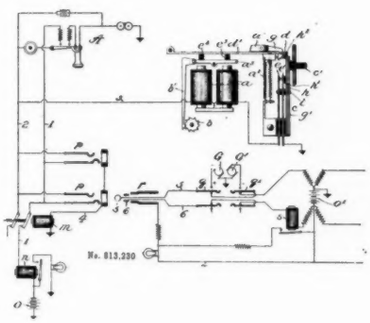
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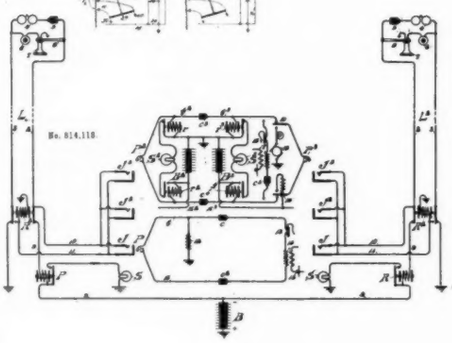
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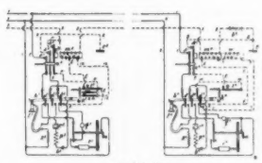
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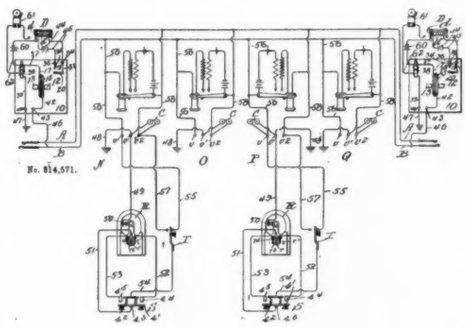
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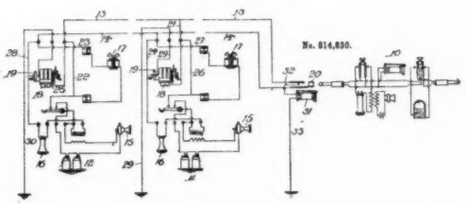
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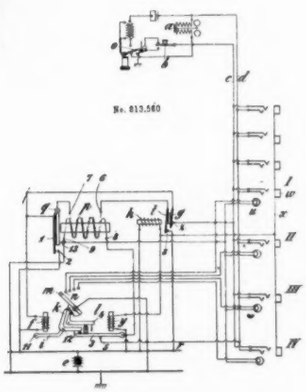
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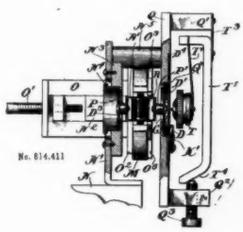
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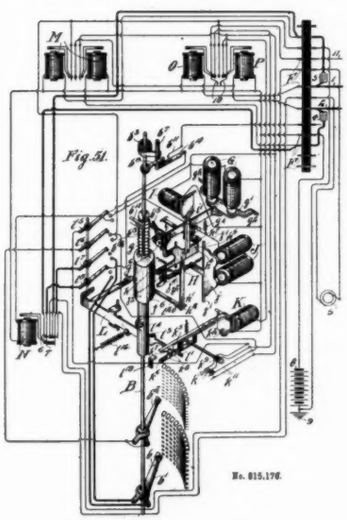
Fig. 51.
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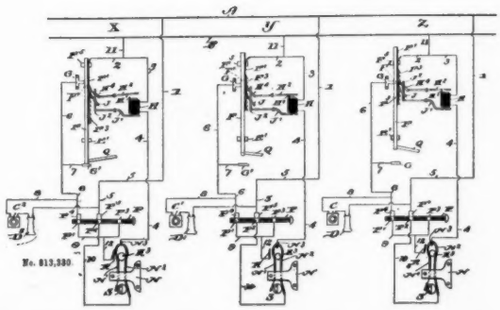
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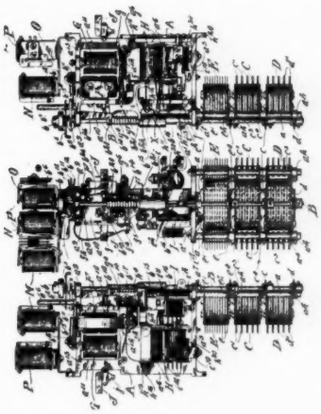


is saturated with germicidal substances. The paper sheets are torn off in order to get clean surfaces. Patent unassigned.

814,830. Telephone System; L. W. Carroll. This is another party-line scheme for interchanging signals without calling central. Ground and metallic circuits are employed, with means to ground the line when calling central. Patent assigned to the Kellogg Switchboard & Supply Company.

814,942. Wireless Telephony; A. F. Collins. Mr. Collins proposes to use the "speaking arc" shooting high potential current into the earth, and thereby conveying an impulse to a distance. An arc light or the equivalent appears in every claim. Patent unassigned.

815,006. Thermal Protector and Alarm; F. B. Cook. Another one of Mr. Cook's many patents relating particularly to apparatus in which heat coil devices and carbon lightning arresters are employed in conjunction with each other. When a heat coil is operated a local alarm circuit is closed. The heat cartridge shown has a central coil with a hollow core and one head soldered into this core, while the other is connected thereto direct by a mass of insulating material. Patent unassigned.

815,042. Telephone Exchange; B. Salzmann. This gentleman also resides in Germany, at Berlin. Our German friends are getting busy in telephony. The invention is a somewhat incomprehensible arrangement of keys and relays for operating busy signal lamps apparently for trunk operators. Patent unassigned.

815,107. Telephone Toll Apparatus; G A Long This is a toll call for Strowger automatic telephones The patent is assigned to the Grey Telephone Pay-Station Company of Hartford, which shows that our business friends are getting wise to the possibilities of automatic The coin is dropped in, but is not thrown into the till until the subscriber pushes his calling button, which is the indication that the wanted connection has been obtained. If he desires to save his coin in case the line is in use, he may listen in, if the circuits are arranged in that way, or he may get a busy signal. If there is no warning signal, he presses the button to ring his correspondent, and thereby deposits the coin.

815,176. Automatic Telephone Connector Switch; A. E. Keith and J. and C. J. Erickson. This is the connector or final switch used by the Automatic Electric Company of Chicago. The patent has eight sheets of drawings and eighteen printed pages of text. There are forty-five claims, all relating to the mechanical features of the switch, which are pretty well covered in detail. Patent assigned to the Automatic Electric Company.

815,321. Automatic Telephone Selector Switch; A. E. Keith and J. and C. J. Erickson. This is a companion patent to the preceding one, covering the intermediate or selector switch of the Automatic Electric Company. Both applications were filed in 1905. The present patent has eight sheets of drawings and sixteen pages of text with twenty-two claims.. Patent assigned to Automatic Electric Company.

815,322. Art of Telephony; D. M. Therrell. This is a very learnedly presented scheme for wave transmission without substantial distortion, by means of peculiar arrangements of coils and capacities. Patent unassigned.

BULLETIN NUMBER NINE.

The National-Interstate Telephone Association in its official bulletin number nine states that since the last bulletin was issued, toll line map of West Virginia has been commenced. This makes fourteen state maps, all told, on which the association is working at present. The map of Ohio is practically completed and will be printed in connection with the latest Independent statistics of the state for distribution at a nominal price on or about May 10. All Ohio companies who have not furnished data for their systems are urged to do so without delay, so that their lines may be included in the map when published.

The committees announced last month have taken up their work and would like to hear from practical Independent men regarding the subjects to be considered. Every one connected with the Independent movement is interested in the work of these committees, and there are many who are peculiarly qualified to assist them. Now is the time to give your associates in the telephone field the benefits of your ideas or experience. Address your communications to the chairman of the proper committee.

The annual convention this year will be held in Chicago at the Auditorium Hotel, on June 26, 27 and 28. The change in place to Chicago from St. Louis, as previously announced, was authorized by the executive committee at the request of many prominent telephone men, in view of the fact that the Kinloch Telephone Company of St. Louis will be cutting over to its new switchboard at the time of the convention and requests that the association meet in St. Louis next year, when it will be in a position to properly entertain them.

The bulletin calls attention to the fact that the Arkansas Independent Telephone Association was organized at Little Rock on February 11. Mr. Eugene Hale, Ozark, is president; Mr. John B. King, Texarkana, secretary. A complete list of officers and report of proceedings have already been published in TELEPHONY.

Independent telephone securities are regarded as more substantial and occupy a higher place in the investment world to-day than at any time in their history. Large amounts are now being sold in the markets of the country on a five and six per cent basis. Reports received indicate that more new money will be spent this year by Independent companies than in any one year in the past. A great deal of this will be used in taking care of new development by making extensive additions to existing plants and extending toll lines into undeveloped territory. A large amount, however, is being spent on new properties in building up the few remaining cities where Independent exchanges have not been installed. That the value of Independent securities is being generally recognized is attested by the fact that some of the largest financial interests of the country are investing heavily in these securities, and consider them as safe and profitable as the securities of other public-serving corporations. The preference shown by the citizens of various places for Independent service does much to increase the favor with which Independent securities are being regarded by invstors. At Seattle, Washington, over 2,000 telephone subscribers have ordered the Sunset (Bell) Telephone Company to take out its instruments, as they prefer to use the Independent service exclusively. A number of California cities have an Independent development as high as one telephone to every five of population.

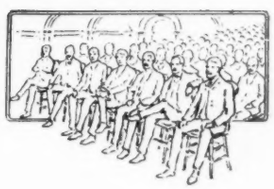
The association notes an increased demand for the Standard toll sign. This sign is, in effect, the banner of Independent telephony, and all Independent companies should take pride in displaying it at their exchanges and pay stations. Show the people where you stand and help educate them to "Look for the Shield."

MICHIGAN CONVENTION.

The ninth annual meeting of the Michigan Independent Telephone Association was held at Ann Arbor on March 22-23, 1906. The full report of convention will appear in the May TELEPHONY.

The annual convention of the Ohio Independent Telephone Association was held at Columbus, Ohio, on March 29, as this issue of TELEPHONY was going to press. The full report of this important convention will be found in the May TELEPHONY.

TELEPHONE CONVENTION IN WEST VIRGINIA



By Earl C. Long

THE first annual convention of the West Virginia Independent Telephone Association was held at Parkersburg on February 22-23. It was a well attended and enthusiastic meeting. In calling the meeting to order Mr. J. Walter Barnes, the president of the association in his address said:

PRESIDENT'S ADDRESS.

Invention of any public utility is a great event in the life of the people. We have witnessed the invention of the steam engine, its application to navigation and railroads, and have seen its marvelous growth. The telegraph also has welded the world into one nation as far as communication is concerned. But it remained for the telephone to transmit the human voice and bring distant cities and towns in closer touch. The rapidity of growth of these different inventions has been very great, but in comparison the telephone has outstripped them all. Its growth has been marvelous.

The business of telephony is as yet in its infancy. It has passed from the category of being a luxury to that of being a necessity in business and the home. It probably touches the people more closely than any other public utility. The telephone was first used in 1876, and from that time on almost exclusively by the Bell until 1894, when the patents expired, and the increase from this period 1894 to the present time has attained the remarkable record of something like 2,000 per cent.

There are some 500,000 stockholders in the Independent telephone companies, and the Independent telephones outnumber the Bell telephones in the United States. This, notwithstanding the fact that the Independent telephone companies have not been able to establish exchange centrals in many large cities, such as New York, New Orleans, Cincinnati, San Francisco and Washington. But an Independent company has finally found a franchise that will enable it to enter New York, and it promises that inside of three years it will have 250,000 telephones in service, whereas the Bell has only 175,000 in New York.

The Independent telephone movement in West Virginia, while it is not remarkable in some sections, in others has had a very rapid growth. There are some eight or ten strong companies in the state that have a very large volume of business, and these with their allied small companies are doing much to cripple the Bell monopoly, until it is forced to give free telephones for a certain period. It offers a free residence telephone with a business telephone, and has lowered its rates in certain sections below what business can be done for, and tried to put the Independent telephone companies out of business. The public cannot be so easily deceived; they know that had it not been for the Independent movement they would be practically without telephone service because of prohibitive rates.

The first Independent telephone exchange was built at Clarksburg in 1892, when Moore Jackson, C. L. Hickman, Dr. Morgan and others purchased some telephones and started a small exchange, the line running from Clarksburg toward Weston. Suit was entered by the Bell company and these telephones were confiscated and burned by order of the court in the public square. But it was a conflagration that served only to stir the hearts of these people the more, and in 1893 the Clarksburg Telephone Company was organized and the fight renewed. The exchange became a success, and out of it has grown the present Consolidated Telephone Company, embracing allied companies in several counties.

Delegates West Virginia Independent Telephone Convention, Parkersburg, W. Va., February 22-23, 1906.

In July, 1896, there was organized the Central West Virginia Telephone Association for the mutual protection and advancement of all Independent telephone interests in West Virginia. This association had several meetings, but the records do not show how often these meetings were held, and I am not advised as to how long the association existed, but I found a constitution and some minutes that stated that the Central West Virginia Telephone Association met at Clarksburg, on September 17, 1901, and that Mr. John Koblegard was president, and that at this meeting Mr. H. C. Henderson was elected president for the ensuing year. At a meeting at Fairmont in 1902 the association disbanded by reason of the fact that there was a disagreement over plans for employing a man to look after and equalize the tolls between the companies. In May, 1905, a call was issued for a convention by Mr. A. C.

Davis, at Parkersburg, asking all the Independent telephone companies in the state to meet for the purpose of organizing anew the West Virginia Telephone Association in order that the state might be represented in the National Inter-State Telephone Association in June, 1905. What was done at this meeting the minutes of the secretary will show.

A perfect state organization of the telephone interests is almost impossible so long as the companies are so scattered and dependent on their resources for support, because of the limited number of toll lines in the state to furnish an interchange of business. The object of this association, as we see it, is to form such a union as will more firmly cement the Independent interests, to promote uniformity of operation, construction and equipment, and to defend by co-operation the different companies, and to give all moral and legal support in any aggressive movement against the common enemy, to procure the enactment of such legislation as will be to our best interests, to interest home capital and home people in our enterprises, to devise ways and means to protect the companies against the attacks of the opposition, and to aid by judicious advertisements and maps as may be for our best interests.

The great needs of the Independent telephone companies in this state to-day are, as I take it: First, a traffic association of some character, in order that an equitable division of tolls can be made between the companies for long distance business. Whether or not the different companies should join the Eastern Traffic Association; or whether we should adopt Mr. Handlan's suggestion of pooling all toll lines on the basis of cost is to be determined, or continue in Tri-State Toll Association. Second, the settlement of all disputes should be according to the rule recommended by the board of directors of the National Interstate Telephone Association, that is by arbitration. The president would state that the executive committee has in a manner divided the state into districts, so that one member of the executive committee of the association is assigned to each district, and that all matters and disputes should be filed with him, and he then should call in two other members of the executive committee from other districts to act with him. Third, the proper dealing with rural lines or mutual telephone companies, which is probably the most important question to come before the association and which is to be fully discussed in papers before this assembly by gentlemen fully competent and prepared to give pertinent recommendations. Fourth, we should have a committee on legislation and a committee on traffic. Fifth, there should be a map made showing all toll lines of the different companies with their connections. This matter is of great importance and should be placed in the hands of the committee.

In brief, I have attempted to sum up the situation, and there is everything to encourage us to go forward to meet the competition we have that is not of the fair, open sort which we like, but is covert and underhanded, even posing under the name of Independent companies in an attempt to accomplish its ends.

After the president's address Mr. Frank B. Hall of Wheeling read a paper on "Standard Construction," which was freely discussed, followed by the appointment of several committees. This closed the first afternoon's session.

In the evening after the mayor's address of welcome, Hon. James B. Hoge, president of the National-Interstate Telephone association, delivered an address on "The Future of Independent Telephony," which is published in another part of this issue and should be carefully read by Independent telephone men.

The second day's session was opened by a paper on the "Rights of Territory" by A. C. Davis, which appears among the telephone convention papers in this issue. Mr. Davis was followed by E. K. Hertford, whose subject was "Switchboard Operation." The others papers read were: "Independent Telephone Securities," by W. C. Handlin; "Our Legal Rights," by W. W. Brannon, and "The Ideal Manager," by L. M. Hutchinson.

The following officers were elected for the ensuing year: President, C. W. Handlan, of Wheeling; vice-presidents, first district, J. H. Wise, of Cameron; second district, W. W. Cayton, of Parsons; third district, J. Downs, of Buckhannon; fourth district, Hugh Amos, of Burnsville; fifth district, Lon H. Hutchinson, of Huntington; secretary, A. C. Davis, of Parkersburg; treasurer, Lloyd Beeghely, of Weston; delegates to National Interstate Telephone association, Lon H. Hutchinson, of Huntington; W. C. Handlan, of Wheeling, and A. C. Davis, of Parkersburg; alternates, A. B. Kratz, of Galliopolis; E. K. Hertford, of Charleston and L. H. Bowers, of Point Pleasant.

HOW SEASONING EFFECTS TELEPHONE POLES

United States Department of Agriculture Forest Service Issued Quite Recently the Following Interesting Information

WITH the life of telephone and telegraph poles at its present limit, the 80,000 miles of existing lines, requiring 32,000,000 poles, must be renewed approximately four times before trees suitable to take their place can grow. A pole lasts in service about twelve years, on the average, but is made from a tree about 60 years old. In other words, to maintain a continuous supply five times as many trees must be growing in the forest as there are poles in use. The severity of this drain upon forest resources by the telephone and telegraph companies is obvious enough. Just as in the case of railroad ties, the question of pole supply has thrust itself into prominence. To lengthen the life of poles, and in this way to moderate demand and conserve future supplies, has become an important matter, affecting the public as well as private interests.

Since 1902 the forest service has been making a thorough study of the preservative treatment of poles and of the value of the seasoning in relation to treatment. In this work its first object has been, as in its studies of cross-ties and construction timbers, to make the timber last as long as possible, so as to check the annual demand for renewal and thus lessen so far as possible the drain upon the forest. Co-operating with telephone and telegraph companies, railroads, lumber companies and individuals, it has urged forward a series of experiments covering all phases of the problem, from the question of the best season for cutting, through subsequent stages of handling, to the final setting of the pole. Some of the most important results obtained deal with the seasoning process.

Seasoning was studied in the first place to determine the rate at which poles become air dry, that is, lose as much moisture as they will part with through evaporation in the open air. The time of cutting was also carefully considered. Experiment proved that poles cut in the winter dry more regularly than those cut in other seasons, and also shows a greater loss in moisture at the end of six months' seasoning. The advantages of winter cutting are, therefore, even drying, with a minimum liability to check, and light weight—an obvious advantage for shipping by freight. Spring or summer cutting secures a more rapid loss of moisture at first, owing to the temperature, but only for three or four months. At the end of from six to eight months spring and summer cut poles are found to have dried only three-quarters as much as winter cut poles. Spring and summer cutting, however, would result in saving in freight and increased durability if the poles are to be shipped and used within three or four months after cutting.

The second point to be determined was the degree of

shrinkage in circumference during air seasoning. This was found to be very light, averaging but little over 0.5 per cent at the butt and 0.6 per cent at the top. The rapid shrinkage of wood does not begin until the percentage of moisture is reduced lower than is possible in the case of telephone and telegraph poles in-or-out-of-door seasoning.

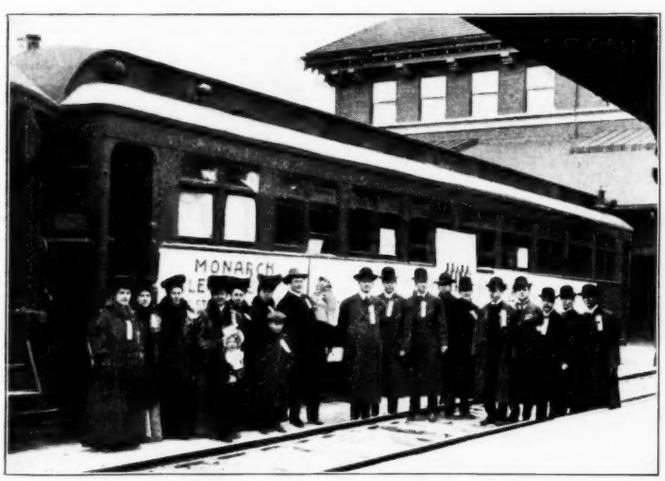
The effect of soaking in water upon the rate of seasoning was the third of the problems dealt with. The experiments substantiate the common opinion that poles soaked two to four weeks subsequently season at a materially increased rate.

Finally, it was found that checking in the course of seasoning is not serious when the poles have been carefully cut. Rapid-grown timber, however, when so carelessly cut as to leave jagged ends, was found to split badly at the butt and at the top. This doubtless merely the widening of cracks started when the stick partially broke off instead of being cut clear through.

Just how much thorough seasoning will add to the life of poles cannot be told until the actual tests are made in service. The poles upon which the tests are being made have been set in a line where their behavior can be compared with that of unseasoned poles, and will be closely watched. Upon a large number of the seasoned poles a test was also made to show the value of various preservative treatments, which is expected to throw additional light on the subject of durability.

IOWA CONVENTION.

The tenth annual meeting of the Iowa Telephone Association was held at the Chamberlain Hotel, Des Moines, March 13-14-15. The attendance was the largest in the history of the association and the programme was a long and interesting one. The first day's session was devoted to



Private Car of the Sioux City Delegation.

the president's address, appointment of committees on credentials and organization detail. At the opening of the second day's session, H. A. Douglas of Cedar Rapids read a paper on "The Best Method of Handling Subscribers' Toll Accounts," followed by a paper on "Care and Maintenance of Equipment" by R. A. Walker of Iowa Falls. C. H. Smith of Sioux City read a paper on "Better Long Distance Connections"; George T. Hewes of Des Moines followed with a paper on "The Clearing House," which is published in full among our convention papers; and E. E. England of Mt. Pleasant closed the second day's session with a paper on "Our Needs in Iowa." The third day was taken up with a paper by Chas. C. Deering of Boone, on "District Organization"; "Tactics of the Opposition," by J. H. Shoemaker of Waterloo; "Toll Service," by Geo. N. Bandy of Des Moines; and "Managers' Experiences," by G. T. Everett of Columbus, Neb. A resolution was offered to the effect that all annual meetings should be held in Des Moines. The Sioux City members, who attended the convention in their special car, opposed this resolution, and it was finally amended to read that all annual meetings should be held in Des Moines unless otherwise voted by the association. The illustration of the Sioux City delegation's special car is shown herewith. The officers elected for the ensuing year are as follows: President, P. C. Holdoegel, Rockwell City; secretary and manager, Charles C. Deering, Boone; first vice-president, E. T. Averill, Cedar Rapids; second vice-president, E. E. England, Mount Pleasant; third vice-president, H. A. Kinne, Woodbine; treasurer, G. W. Graves, Denison. Executive committee: J. S. Bellamy, Knoxville; E. H. Martin, Webster City; J. C. Thomas, Fairfield; George N. Bandy, Des Moines.

MR. MACLAY HOYNE.

We present herewith a portrait of Mr. Maclay Hoyne, assistant corporation counsel of Chicago, and the attorney who was mainly responsible for the victory of Chicago over the Chicago (Bell) Telephone company in the recent litigation in the Illinois Supreme Court, wherein the court de-

Maclay Hoyne, Assistant Corporation Counsel of Chicago.

cided the Bell company must make restitution of the moneys unlawfully collected from its subscribers.

The victory of the city was complete and Mr. Hoyne deserves the thanks of all Independent telephone men for bringing the Chicago Telephone company to a realization of the fact that the people of Chicago have some rights which even the Bell telephone trust must respect.

MANUFACTURERS DEPARTMENT

NEW SWITCH HOOK LEVER.

The Dean Electric Company of Elyria, Ohio, has designed and is manufacturing a new switch hook lever made in the most substantial manner possible and of a neat design, by pressing and drawing it to the proper shape by numerous operations from one piece of heavy sheet brass.

Figure 1.

The number of operations required to form this hook compacts it in such a way as to close all the pores in the metal, thereby strengthening and hardening it so that when completed it has the appearance of a solid metal hook lever. Another point of value is in the strength of the lever at the

Figure 2

body of the forks, as at this point more hooks are broken than any other place. It will be noted in the view of the second operation that this part of the hook lever is drawn up in the shape of a triangle so as to brace the prongs of the hook and insure great strength. The metal is doubled over,

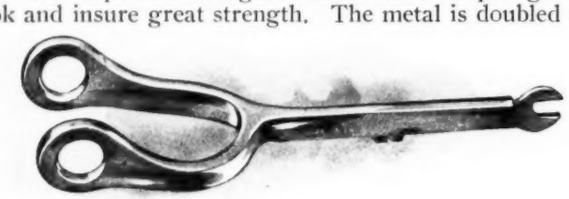


Figure 3.

not only on the body of the lever, but in both prongs, making the latter very rigid.

The accompanying illustrations, Figure 1 shows the blank, Figure 2 the second operation, Figure 3 the completed hook, and Figure 4 the hook lever mounted in the Dean hook switch. As the hook lever, when projecting from the side of

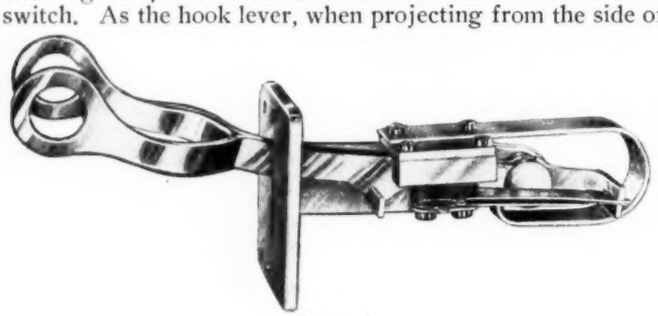


Figure 4.

a telephone, is subject to much damage in shipping, storage and handling, it is made removable in the Dean construction so as to be left detached until the instrument is mounted in position on the wall. This has the additional advantage of saving packing and storage space. The lever can only be removed by opening the lid of the telephone box, as the release is mounted on the body of the switch, thereby making the device fool proof.

Like all other novel Dean products, these features are protected by several pending patent applications.

A NEW CROSS ARM SUPPORT.

A device which will undoubtedly appeal to all those interested in telephone line construction is illustrated by the cuts on this page. Its name implies its purpose and its advantages can be seen at a glance. The article is a steel gain and is manufactured by the Steel Gain Manufacturing

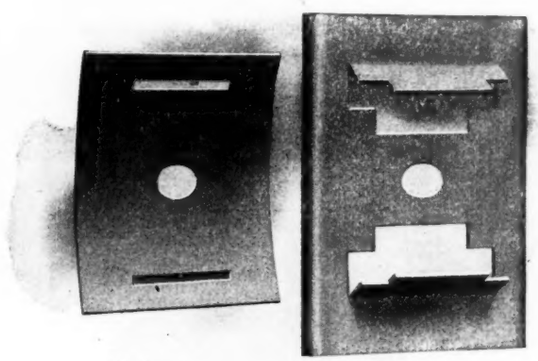


Figure 1.

Company, a corporation recently organized in Chicago. The present offices of the company are at 14 South Clinton street and the management is under the direct supervision of Kempster B. Miller, president, Walter H. Trimm, secretary, and Ernest E. Yaxley, treasurer.

While improvements have been made in telephone apparatus, the old methods of construction are still largely used. It is an acknowledged fact that a gain cut in a telephone pole is a detriment to the pole for several reasons.

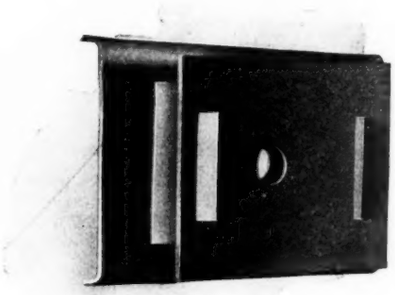


Figure 2.

In the first place, a cut gain weakens the pole at the very beginning and tends to cause further weakness during the life of the pole. By exposing the end grain of the wood at each gain, the best possible opportunity for rot to occur is afforded; consequently, many poles become absolutely worthless simply because of the excessive rot at the gains. Furthermore the portion of wood removed when cutting a gain is, of course, at the outside of the pole, which is the

strongest part of any piece of wood. The use of the steel gain eliminates this fault.

As shown in Figure 1, the gain consists of two pieces; a curved steel plate adapted to embrace the pole and a steel gain provided with projecting braces or tongues which pass through apertures in the pole plate. Shoulders on these braces clamp against the pole plate and afford a rigid support for the gain. The ends of these braces passing through the pole plate engage the pole and supply a further support to the whole structure. The pole plate normally has a greater radius than the largest pole top, and when drawn into place not only conforms closely to the circumference of the pole, but draws down against the gain, thus providing sufficient spring tension to compensate any shrinkage in the pole or cross arm. The gain itself is of such length and supports the arm to such a degree that it renders it unnecessary to use cross arm braces on four or six pin arms. The assembled gain is shown in Figure 2, and its strength is demonstrated in Figure 3.

To attach a cross arm, it is simply necessary to clamp it in place with the gain by means of a through bolt. The relation of the gain to the pole plate is such that the arm is brought into perfect alignment without the use of a square.

The gain is made throughout of heavy Bessemer steel and can be furnished either plain or galvanized at a price not exceeding the cost of a cut gain.

In summing up the advantages derived from this steel gain, the manufacturers give the facts in a few short state-

Figure 3.

ments. The steel gain can be bought for the same amount or even less than it costs to cut a gain in a pole. It afford a much stronger means of attachment for the cross arm. It entirely eliminates the necessity of having cross arm braces on four or six pin arms. It facilitates the placing and alignment of cross arms. It strengthens the pole instead of weaking it. It prevents rot and trouble from frost and ice. It saves an enormous amount in gains that are cut and never used. It can be placed on a standing pole easily and quickly. It provides a means of mounting new cross arms on old poles having rotted gains. It makes a five-inch top as strong as a six-inch top with a cut gain. It is an improvement which is practical, cheap and valuable to every man building telephone, telegraph or electric light lines.

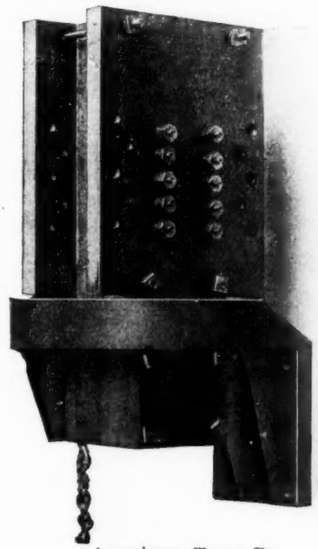
The steel gain above described is not an experiment, it having been in use for fifteen or eighteen months. Several of the largest pole line companies in the Northwest have adopted it for all of their pole line work. They find that all of the claims of the manufacturers are well founded and that the lasting qualities of the gains is a big feature in its favor.

An illustrated folder fully describing the steel gain and setting forth its advantages in detail is ready for distribution and will be mailed to any one making inquiry for same. The gains may be purchased from any of the supply houses or direct from the Steel Gain Manufacturing Company, 14 South Clinton street, Chicago.

AMERICAN ELECTRIC FUSE COMPANY SPECIALTIES.

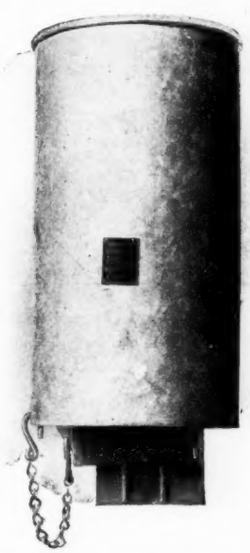
A most complete line of cable terminals is manufactured by the American Electric Fuse Company of Muskegon, Michigan. A few of the most popular types are shown here and in the company's advertisement in this issue.

Type "D," an illustration of which is shown, is a terminal

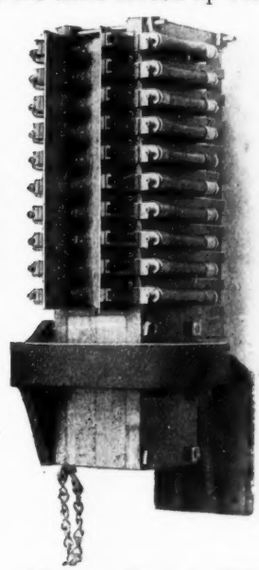


American Type D.

for multiple tap work and contains no protection. The jumper wires connect to lock nut binding posts and the cable terminals are heavy brass soldering clips. By loosening the corner bolts, the sides of the head, which are set in grooves, can be raised and plenty of work room is thus provided. To connect the cable, the corner bolts in the base are loosened and the end of the cable forced up between



American Type A, Closed.



American Type A, Open.

the two base blocks; calk with oakum, tighten the bolts, and the cable is solid. Solder the wires, drop the slides, fill the compartment with compound and the job is done.

Type "A," which is shown here, is similar in construction to type "D," but is provided with tubular line fuses and carbons, thus affording the best known protection from lightning and other dangerous currents. The line fuses are

of the popular American type and are held rigidly in place by a new American spring clip, which insures a perfect connection and yet allows them to be quickly and easily removed. For compactness and neatness, yet having ample work room, these types are certainly leaders. The cover of these terminals is of heavy galvanized iron and locks securely in place either up or down. These types are made in standard five, ten and fifteen pair sizes, and are being extensively used by many of the large telephone companies. Any size desired can be furnished.

Other types are shown in the company's advertisement in this issue as well as illustrations of the new American circle tops.

Upon application to any of the offices of the company in New York, Atlanta or Muskegon, Mich., circulars descriptive of this line of goods can be secured.

THE NEW WESCO CLUB.

An interesting and important outgrowth of the annual convention of The Wesco Supply Company's traveling men, held at the Southern Hotel, St. Louis, January 21-29, was the organization of the Wesco Club. Its membership roll includes the entire sales force of the company.

The New Wesco Club.—The sales force of the Wesco Supply Company, St. Louis.

The officers elected for the first year are: N. J. Roth, president; E. E. Rines, vice-president; H. Buecker, secretary. Mr. Roth covers northern Missouri and eastern Kansas for Wesco; Mr. Rines has just been assigned to new territory consisting of Iowa, Nebraska and southern South Dakota, with headquarters in Omaha; and Mr. Buecker is the man upon whom depends the happiness of the whole army of Wesco customers, he being the superintendent of the shipping department.

No treasurer was elected, because the club will have no treasury to look after. Membership in the Wesco Club doesn't cost a cent.

The purpose of the new organization is to promote harmony between Wesco and Wesco's customers and incidentally to spread the gospel of good electrical supplies at fair prices. The club members figure that the more goods you buy from Wesco, the greater your prosperity will be, and they are one and all prepared to demonstrate this to be a fact, as you will find when the Wesco man in your neighborhood gets around to see you.

The Wesco Supply Company has just closed the most prosperous year in its history, and everything points to a most promising future. The convention was noteworthy for the striking harmony and spirit of co-operation and good fellowship which seemed to characterize the salesmen as a body and it was naturally a result of this dealing and enthusiasm among the men that brought about the organization of the Wesco Club.

POLE CHANGERS AND DUPLEX SETS.

The Current Electric company, Chicago, is receiving many orders from telephone managers for its Standard pole changer and Standard duplex set. The company not only guarantees absolute satisfaction to all purchasers but guarantees immunity from patent litigation of every description.

The entire mechanism of the Standard pole changer is built on the inside of a highly finished quarter-sawed oak case with the binding posts and switchboard on the outside. To observe the interior one has simply to turn it over; there is no glass to remove or get broken. It will work in all positions. Dimensions are 6x8x4 inches; weighs 3½ pounds.

It is claimed by the manufacturer to be economical and convenient, as it takes but one battery to operate it.

Its present price is but $15.00, and it will be sent on thirty days' trial to all responsible parties.

The other telephone specialty manufactured by the Corrent Electric company is the Standard duplex set.

Standard duplex sets are made for, and extensively used on metallic bridging lines, metallic toll lines, trunking lines, etc., as they render one or more additional talking and ringing circuits, according to the original number of circuits and the number of instruments used, without cross-talk or disturbance to the original lines. The company

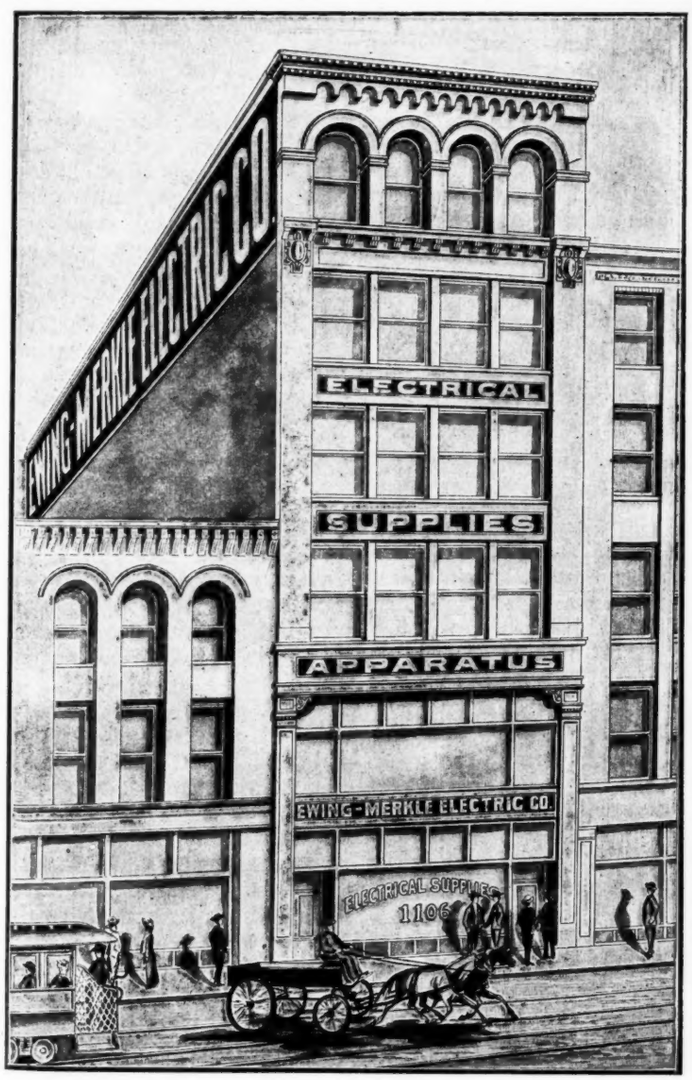
claims that they are simple, inexpensive, easy to connect, have no movable parts or contacts to wear out or get out of order and are well protected by lightning arresters.

CHADEAYNE'S RECORD TRIP.

To prove the practicability and efficiency of the Thomas Auto-Bi machine, Wm. C. Chadeayne started from New York, September 13, 1905, on one of the most perilous trips ever attempted by any motorcyclist. He experienced all manner of hardships, riding at times day and night, over mountains, through valleys, gulches, deserts and plains, and bumping railroad ties for many miles. He met with several accidents, had a siege of illness, and in fact had all kinds of hard luck. He finally arrived in San Francisco, October 30, after covering 4,000 miles, and establishing a new transcontinental record of 47½ days. This record made at this time of the year is simply wonderful, and shows conclusively what the Model No. 44 Thomas Auto-Bi will do.

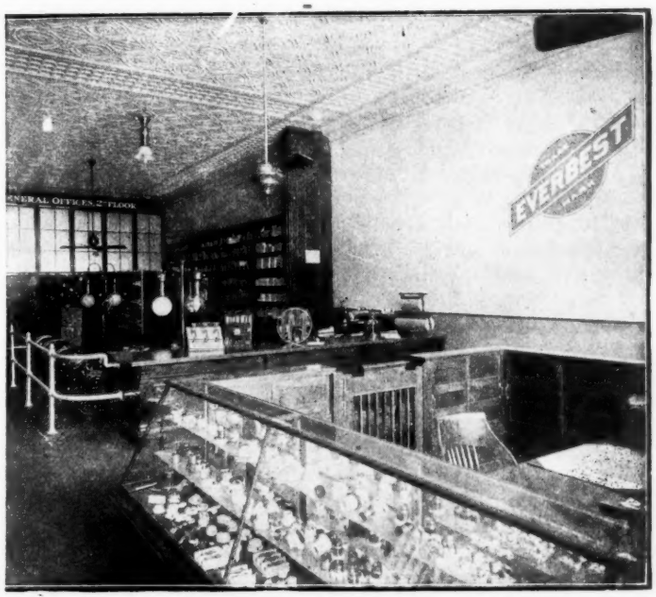
EWING-MERKLE ELECTRIC COMPANY.

The Ewing-Merkle Electric Company, St. Louis, Mo., was organized and incorporated in April, 1903, for the manufacture and sale of electrical and telephone equipment



Building of the Ewing-Merkle Electric Company, St. Louis.

and supplies. The growth of the company has been phenomenal, and it enjoys a large and increasing business, especially so in telephone apparatus and supplies. The telephone department is under the management of Mr. George H. Peirce, who is well known in telephone circles. In the accompanying illustrations is shown the Ewing-Merkle building and a view of the telephone department, where is carried a large stock of telephone apparatus and supplies. The company handles the well-known Sumter apparatus,



Telephone Department, Ewing-Merkle Electric Company, St. Louis.

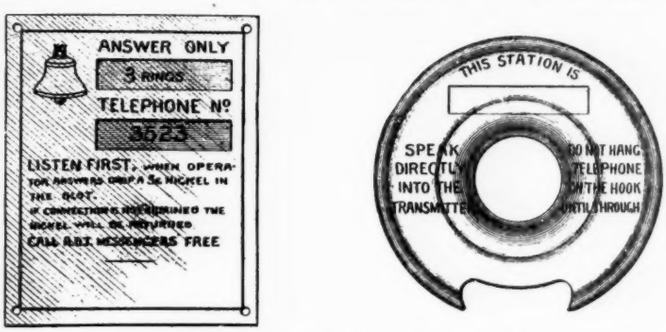
manufactured by the Sumter Telephone Manufacturing Company of Sumter, S. C., having the exclusive agency in the Ewing-Merkle territory. This apparatus has given such general satisfaction that the sales are increasing each month.

"Everbest" quality price and delivery is the motto that has materially assisted the company in building up its present large business.

The officers of the company are as follows: N. W. Ewing, president and treasurer; W. S. Merkle, general manager; W. G. Brown, vice-president and sales manager; Milton Mill, secretary; L. F. Philo, assistant sales manager, and Geo. H. Peirce, manager telephone department.

CELLULOID, TELEPHONE SPECIALTIES.

G. Felsenthal & Company, 219 E. Van Buren street, Chicago, are well known to many readers of TELEPHONY as manufacturers of celluloid specialties for telephone com-



Two Celluloid Telephone Specialties.

panies. Among the articles they make in large quantities are instruction cards, name plates, etc., for use on transmitters or coin boxes.

Illustrations herewith show a couple of the various styles made by this firm. Felsenthal & Company will be pleased to send samples and submit prices on work of this character.

TRADE NOTES.

FRANK B. COOK, Chicago, is sending out a pamphlet illustrating and describing his terminals and junction boxes with net prices.

THE BUTTERFIELD CONSTRUCTION COMPANY, formerly located at 113 Adams street, Chicago, announces a change of address to Room 326, Reaper Block.

THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Conn., now has its commodious and modern factory in full operation. The growth of the concern, which necessitated a larger and better equipped plant, has been rapid and substantial.

THE AUTOMATIC ELECTRIC COMPANY of Chicago has recently issued a folder entitled "Telephone Competition and Its Benefits to the Public," which should be read by everyone interested in Independent telephony. The folder will be sent free upon request.

THE VARLEY DUPLEX MAGNET COMPANY, Providence, R. I., announcse that the American Electrical Works has discontinued the manufacture of the Varley company's patented windings. The Acme Wire Company of New Haven, Ct., is the new licensee.

THE BELDEN MANUFACTURING Co. of Chicago has recently installed a complete modern power plant, consisting of a 125 horse power Westinghouse three-cylinder gas engine, with direct connected generator. This is the largest equipment of this type in Chicago.

JAEGER MINIATURE LAMP MANUFACTURING COMPANY, New York, N. Y., is sending to its customers an aluminum order file with the request that all orders be placed for Jaeger miniature lamps. The company will gladly mail one of these order files upon request.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, has published a unique folder entitled "Distinction of Character." It is purple and white and the reverse plate effect is striking. The folder calls attention to the individuality of Swedish-American apparatus.

THE NORTH PENN IRON COMPANY of Philadelphia, Pa., in its Bulletin 27, calls attention to its line construction material for telephone companies. The bulletin is illustrated and describes the company's full line of specialties. The bulletin may be had by addressing the company.

COMMERCIAL ELECTRICAL SUPPLY COMPANY, St. Louis, Mo., is mailing a folder calling attention to its catalogue of telephone and electrical supplies. The company is calling special attention to the Vought-Berger line of telephones, and invites correspondence from prospective buyers.

THE ILLINOIS ELECTRIC COMPANY, Chicago, has issued its usual monthly net price list and discount sheet applying to catalogue No. 17. The company will be glad to send this complete telephone catalogue upon request and will follow with its monthly net price list and discount sheet.

THE DEAN ELECTRIC COMPANY, Elyria, Ohio, in its series of folders entitled "A Few Things We Make," calls attention in folder number 5 to its harmonic converter, the company's new party line ringing machine. The folder is illustrated and contains valuable data on this important subjec.

THE FAHNESTOCK ELECTRIC COMPANY has removed to 129 Patchen avenue, Brooklyn, N. Y., where all mail in future should be addressed. This move was made necessary by the company's greatly increased business. The new and larger quarters will enable the company to better handle its trade.

"TOLL EQUIPMENT for Public and Measured Service" is the title of the latest booklet issued by the Gray Telephone Pay Station Company of Hartford, Conn. The booklet is printed in color and contains fifty pages fully illustrated devoted to Gray apparatus. The company will send the booklet upon request.

THE WIRE AND TELEPHONE COMPANY OF AMERICA, Rome, N. Y., has issued the first of a series of bulletins, beginning with number 100, which will illustrate and describe the company's complete product. The company sends an attractive binder with the first bulletin, and will be pleased to send one to prospective buyers.

V. C. GILPIN, 120 Liberty street, New York City, has accepted the New York agency of the Scranton Button Company, Scranton, Pa., manufacturers of composition-moulded material which is suitable for all purposes where hard rubber or fiber might be used, especially telephone mouthpieces, receivers, switch handles, socket keys and bushings.

THE LIVE WIRE, published in the interests of the Wesco Supply Company of St. Louis, Mo., is sustaining its reputation as being very live. Each issue contains much matter of an interesting character, and telephone exchange men will do well to send for a copy, which will be furnished free. Address Live Wire Publishing Company, St. Louis, Mo.

THE FIBER CONDUIT COMPANY, Orangeburg, N. Y., recently mailed to the trade an attractive post card showing partial shipment of 180,000 feet of fiber conduit for the Manchester Corporation, Manchester, England. The shipment was made in bulk via railroad and steamship and, although it was handled seven times, still the breakage was almost nothing.

THE THIRD calendar postal card issued by the Central Telephone & Electric Company of St. Louis is entitled, "We are ready; are you?" and shows a little girl standing on a chair using one of the company's telephones, a little boy with abbreviated clothes is standing near. Under the picture there is a calendar for March and the suggestion that the company is ready for spring business, which can't come too fast. The card also invites inquiries for cable prices for May deliveries. By sending your name to the company and mentioning TELEPHONY you will receive the full set of twelve cards as issued.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING Co., Rochester, N. Y., reports having closed contracts for switchboards in the following places: Holton, Kan.; Tonopah, Nev.; Nashville, Tenn.; Elkhart, Ill.; Grand Ridge, Ill.; Bryson City, N. C.; Brantford, Ont., Can.; New York City, N. Y.; Sunset, La.; Mt. Upton, N. Y.; Carthage, Ill.; Central Square, N. Y.; Marcus, Ia.; Franklin, N. C.;

Auburn, N. Y.; Ladd, Ill.; Diagonal, Ia.; Lytton, Ia.; Woodstock, Ill.; Rochester, N. Y.; Seattle, Wash.; Fontana, Kan.; Clarksville, Tenn.; New Cambria, Mo.; Cambria, Mo.; Rupert, Ida.; Elkville, Ill., and Ohio, Ill.

JOHN A. ROEBLING'S SON'S COMPANY, Trenton, N. J., is sending out a booklet entitled "Some Roebling Products." The aim of this folder is to present information of a general character, relating to a few of the products of the John A. Roebling's Son's Company. If you are interested in Roebling products the company will be pleased to send a catalogue giving detailed information on application.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY of Buffalo, N. Y., is mailing samples of an attractive celluloid long-distance service advertisement which it has been using to good advantage in advertising Independent telephone service. The device is to be mounted on the telephon transmitter being held in place by the mouthpiece. The company will gladly furnish sample to anyone interested.

THE TELEPHONE WORLD, published at Lafayette, Ind., is the name of a new publication devoted to Independent telephone interests in general. The first issue contains twenty pages of reading matter and advertising. There is much interesting telephone data given and if future issues are as good as the first one the publication ought to meet with success. Its subscription price is fifty cents per year. Sample copy will be sent free.

THE MOON MANUFACTURING COMPANY'S sales for terminal apparatus for the months of February and March have almost doubled over the corresponding months of last year. Telephone companies are recognizing the economical manner of cable installation by using Moon combination terminals and junction boxes, which have practically revolutionized cable splicing. The company recently received an order for foreign shipment of terminal apparatus of 1,125 pairs.

FRANK B. COOK has received from the Dean Electric Company the order for the complete switchboard protection for the new exchange at Quincy, Ill., it being specified that Cook's No. 8 self-soldering protector shall be used. The distributing frame has a capacity of 4,160 pairs, and is to be equipped with 3,200 pairs of the No. 8 protectors. McMeen & Miller are the engineers who are in charge of the construction.

THE VOUGHT-BERGER COMPANY of La Crosse, Wis., has just completed extensive additions to its plant, having added two new buildings and additional modern machinery to adequately take care of its largely increasing business. The company's growth has been very remarkable. Within the past year the demand for Vought-Berger apparatus has been so great that its sales have doubled over those of any previous year. This company make all its own wood work, including telephone and switchboard cabinets. One of the new buildings added is a very modern dry kiln, built at an expense of several thousand dollars. The company enjoys a reputation of furnishing the highest grade cabinet work in all of its equipment.

THE SUMTER TELEPHONE MANUFACTURING COMPANY, Sumter, S. C., in Bulletin No. 39 describes its line of "New Beauty" long-distance telephones and accessories. The bulletin is profusely illustrated, each part of the instrument being treated in detail, the text accompanying each illustration being very complete. Several pages are devoted to simple telephone troubles and how to find them, together with copious illustrations of different methods of connecting telephones for various classes of service. This matter should prove interesting and valuable to all telephone men. Owing to the great demand for its products the Sumter company is again compelled to enlarge its plant, which already covers over 130,000 feet of floor space.

THE STERLING ELECTRIC COMPANY, Lafayette, Ind., is installing 1,800 lines additional switchboard capacity for the Toledo Home Telephone Company, Toledo, Ohio; 300 additional for the Lima Telephone Company, Lima, Ohio; 300 additional for the Home Telephone Company, Joplin, Mo.; 300 additional for the Newark Telephone Company, Newark, Ohio; 300 additional for the Cedar Rapids & Marion Telephone Company, Cedar Rapids, Iowa; 150 additional for the Bloomington Telephone Company, Bloomington, Ind.; 150 additional for the Canton Home Telephone Company, Canton, Ill.; 150 additional for the Home Telephone Company, Elkhart, Ind., and 150 additional for the Stephenson County Telephone Company. Freeport, Ill. These exchanges as well as others using the Sterling common battery equipment, keep up a phenomenal growth. The circuit used by these exchanges is the one just adjudicated in favor of The Sterling Electric Company by the United States Court of Appeals.

THE AUTOMATIC TIME STAMP COMPANY WINS.

In the case of the Calculagraph Company of New York vs. Jno. C. Wilson, which was a suit brought under the patents of Hamilton and Abbott to enjoin the Automatic Time Stamp Company from making or selling an instrument known as the Timeometer, used on telephone toll-line switchboards to record the time the toll-line was in use by a customer, the United States Circuit Court of Appeals in an elaborate opinion by Judge Colt has reversed the decision of Judge Hale of the United States District Court and has remanded the case to the circuit court with directions to dismiss the bill of the Calculagraph Company with costs in the circuit court and in the court of appeals.

Judge Hale had also found the defendant in contempt for making another machine for the same purpose, known as the Duragraph, and this decision of the court of appeals acts to void this finding also. J. S. Rusk and Frederick L. Emery were counsel for appellant and E. J. Prindle for appellee.

It is claimed of the Timeometer that it prevents disputes about the time a toll line is in use, because the record it makes is indisputable and unchangeable; that it saves the time of the operator, because the time of the beginning and finishing of a toll line conversation may be recorded, and the intervening time automatically calculated and recorded in less time than the operator could learn the time from a timepiece; also that it is indispensable, because it is just to the telephone company and to the user of the toll line, and because it enables the telephone company to get the maximum returns obtainable from the operation of its toll lines with a minimum of expense and annoyance.

MERCURY ARC RECTIFIER OPERATING IN MULTIPLE WITH MOTOR GENERATOR.

The Pacific States Telephone and Telegraph Company of San Francisco has a forty ampere storage battery in use in its exchange at Alameda, Cal. Until recently this battery has been charged from an equipment, consisting of a small direct current generator driven by a single phase motor, of only sufficient capacity to charge the battery at about thirty amperes.

This company has recently purchased a twenty ampere General Electric mercury arc rectifier outfit, and installed it in the Alameda exchange in order to test it in commercial operation. The load on this exchange is so heavy, however,

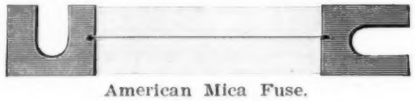
that if the battery were to be charged at only twenty amperes, it would be necessary to keep the charging current on for twelve or fifteen hours per day. It was, therefore, determined to try to operate the rectifier in multiple with the direct current generator, and charge the battery at the normal rate of forty amperes. The generator was started up and thrown on the battery, and the voltage adjusted to give about ten amperes charging current. Next the rectifier was started in the usual way, adjusted to charge at about twenty amperes, and thrown into parallel with the generator. The generator voltage was then raised until the current through the battery was forty amperes, and the charging proceeded.

As the electromotive force of the battery rose and the rectifier current fell off, due to the higher voltage of the generator, the voltage of the rectifier was raised by means of the rheostat at the bottom of the panel. The rectifier voltage could also be varied while the rectifier was operating by moving the compensating reactance switch, as the voltage of the generator kept the arc going while the switch passed over the dead points.

This scheme of operating the mercury arc rectifier in parallel with the generator has been in regular operation ever since it was first tried, and the attendants are very much pleased with it, as they are now enabled to charge the battery in three-quarters of the time previously required.

FUSES AND BLOCKS.

In anticipation of the usual immense fuse business of the spring season, the American Electric Fuse Company has been manufacturing millions of fuses of all styles and is



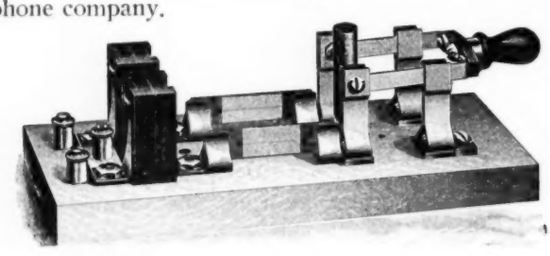
American Mica Fuse.

in position to fill at once all orders, no matter of what size, for mica fuses.

This company employs over one hundred people in its

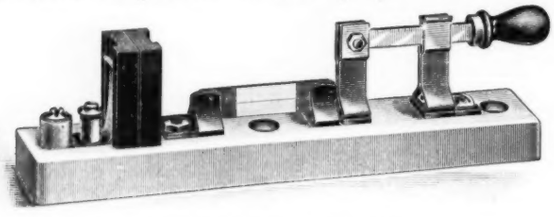
American Mica Fuse.

fuse department, and the amount of copper and mica used each day would amount to a big dividend for an average telephone company.



American Cut Out, No. 500.

Although a mica fuse is a small thing, great care must be exercised in its making and every fuse is thoroughly tested before it is packed. The company's motto has always



American Cut Out, No. 501.

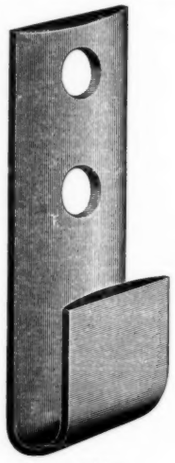
been, "Every Fuse a Good Fuse," and certainly its past record shows that it has lived up to this motto.

Thousands of special fuses for various purposes are made by this company and are used all over the world.

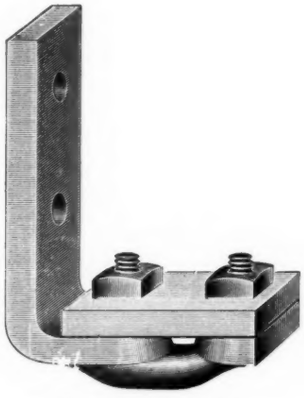
The block department is also a very busy place and thousands of carbon blocks of all styles are being turned out daily. The old and ever popular 500 and 501 are demanded by the trade in larger quantities than ever. No other block seems to fill the popular demand quite as well as these two styles. Combining as they do the fuse, carbon and cut-out switch, they leave nothing to be desired for this form of protection.

NORTON TOOL CO.'S SPECIALTIES.

The Norton Tool Co., of West Park, O., has for some time past successfully cultivated the telephone trade with a line of first-class construction specialties. Among the



Guy Shim.



Dead End Hanger.

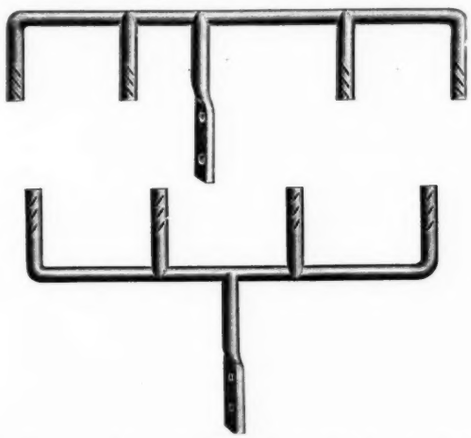
articles the company manufactures are dead end hangers, brackets, guy shims, messenger hangers, clamps, etc.

All of the Norton goods are given the best hot process of galvanizing and are guaranteed to stand acid tests. The company's policy in this respect appears well sustained by the highest authorities. From a recent issue of the Iron Age we quote the following: "I have made some experiments with electro-galvanized articles, and I can fully bear out the statements made in Ed. S. Mowry's letter, in The Iron Age of January 25. Several of my friends have had considerable experience with the cold method, among whom I might mention McCance Brothers' Company, Pittsburg, Pa.; Standard Galvanizing Company, Philadelphia, Pa.; Chattanooga Roofing & Foundry Company, Chattanooga, Tenn., and the barrel department of the Standard Oil Company, Bayonne, N. J. The first three have, after a long experience, thrown out the cold process and are now using the hot process. The Standard Oil Company used the cold process and perhaps does now use it for galvanizing hoops for barrels, but when it came down to the question of galvanizing its steel naphtha barrels which had to be coated thoroughly it was compelled to put in the hot process.

"I have also read the letter of the United States Electro-Galvanizing Company in The Iron Age, in which, among other things, it makes much of the fact that the United States navy yards are using the electro process, leaving it to be inferred that they are using it in preference to the hot process. I am not familiar with the facts at any of the navy yards excepting at the Philadelphia Navy Yard, but I am thoroughly familiar with the state of affairs there. It is now operating two or three hot plants, and probably ninety-five per cent of its galvanizing is done in these plants. It is true that it has a cold plant, but it is only used for galvanizing very small articles and I am informed that it is using the cold process principally on the sheaves and hooks for its blocks. The reason for this is that the navy yard people have an idea that the strength of the hooks and sheaves is

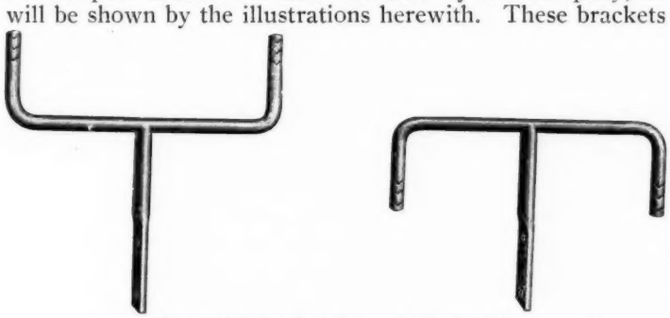
somewhat impaired in the process of hot galvanizing. This, however, I think is a mistake, but be that as it may the fact remains that all the principal galvanizing done at the League Island Navy Yard is done by the hot process."

The Norton Tool Company has sold thousands of its combination messenger hangers in the past five years and has never had one reported wrong. Sizes are 1¾" x ½" and 2" x ½". The company's Little Giant Hanger is designed



for lighter lines and is especially desirable for such purposes, but one bolt or lag screw of ⅝ inch being required.

The forged steel clamps of Norton make require no clips and are warranted never to break or slip. A very extensive line of pole brackets is manufactured by the company, as will be shown by the illustrations herewith. These brackets



Four Different Styles of Pole Brackets.

are torged from ¾" and ⅝" round, with points round or flat as ordered, and come either japanned or galvanized. The window brackets made by this firm are similar in qualities to the pole brackets and include a very useful gable bracket for use in going over roofs.

The Norton Tool Co. will be pleased to send its circular matter and answer promptly all inquiries made by telephone companies.

LANDED AT LAST.

In the criminal court of Chicago, a jury on Thursday, March 1, brought in a verdict of guilty in the case of Ralph Lipsey, indicted for receiving stolen property, the penalty for which is imprisonment in the penitentiary for not less than one year nor more than ten years. In this case the jury found that Lipsey, who was the president of the Great Northern Metal Company, Chicago, had received and again disposed of four cases of key sockets which had previously been stolen from one of the large jobbing houses of Chicago. Many of the jobbing houses have suffered more or less from petty thieving, as well as from graver acts of stealing involving often goods of considerable value, and the electrical jobbers and manufacturers of standard supplies have taken much interest in this case.

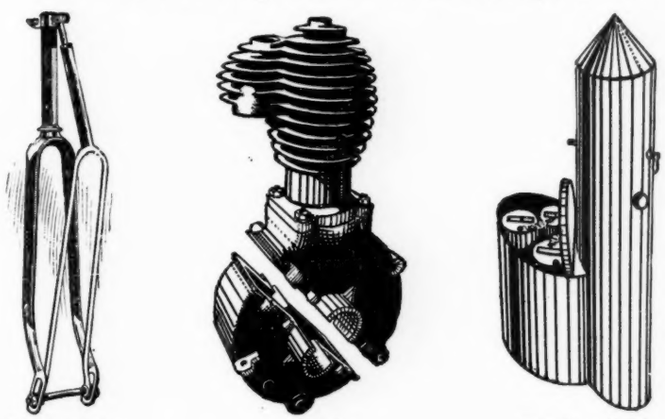
The disclosure of the facts of receiving stolen property is one of the most difficult capable of legal proof, and, in this case, the defense left no stone unturned to escape the jury and the verdict of guilty. The commission of this offense is one that is a constant menace to the legitimate trade, for unless the thief can find a fence to dispose of the stolen goods there would be few, if any, serious cases of this nature. The electrical fraternity generally are gratified at this conviction, one of the first in quite a long period of time, and the hope is everywhere expressed that the findings in this case will go a long way to deter the all too prevalent looting of electrical houses.

The evidence in this case was prepared by Frederic P. Vose, who assisted the state's attorney in the prosecution of the case, which was ably handled from the time suspicion first attached to Lipsey as the guilty party down to the finding of the jury and the conviction of the prisoner.

THE 1906 THOMAS AUTO-BI.

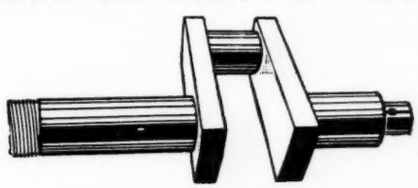
Telephone companies, which are rapidly being converted to the use of motorcycles as great economizers of time, money and labor, will be interested in the following letter recently received by TELEPHONY from the manufacturers of a well-known machine:

"The Thomas is the pioneer American motorcycle, and in



Front Forks. Cylinder. Gasoline Tank.

the 1906 model, No. 44, machine, made by the Thomas Auto-Bi Co., 1443 Niagara street, Buffalo, N. Y., the manufacturers have used their years of experience in producing a machine different from anything heretofore on the market—a machine for the average buyer, who is not a mechanical expert, acquainted with the principles and construction of gasoline motors. This machine is so constructed that it



Crank Shaft.

can readily be taken apart, and all parts inspected and assembled even on the road, without removing the engine from the frame. Many improvements and new features are comprised in the model, among them being the following:

"The control of entire machine is accomplished by means of an adjustable grip on the handle bar, working on a friction cone so that the grip will stay at whatever point it is placed, without attention of the rider. There is absolutely no vibration in speed due to turning sharp corners when machine is in motion.

"The gasoline tank is a strong, cylindrical, torpedo-shaped tank holding six quarts, in which the needle point is directly located, doing away with intermediate valves. The battery box attached to gasoline tank is of triangular shape, holding three cells, and fitted with flexible connections.

These cells are of standard make, packed in pastecard cylinders which prevents short circuiting.

"The Thomas Buffalo mixer is used, and is fastened directly to motor head.

"The motor is of one piece, cylinder and head of phosphor bronze.

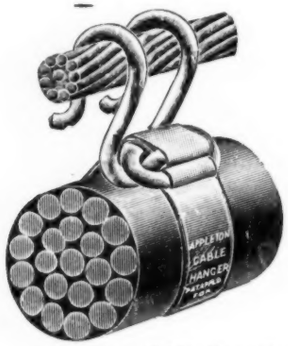
"Bearings are extra large throughout. Adjustable connecting rod, also of phosphor bronze, and with the use of a hardened one-piece crank, makes them very durable. The crank case bolts directly to frame, of which it is an integral part, and the lower case can be removed at any time for inspection. Timing gears can be inspected by removal of one nut. All valves are large and so located that they can be easily removed.

"This machine is a three horsepower with two and seven-eighths inch bore and three and one-quarter inch stroke. The wheels have extra heavy spokes, wood rims, and are fitted with one and three-quarters and two inch Goodrich, G. & J. or Dunlop tires. A Corbin duplex motorcycle brake is used on rear hub.

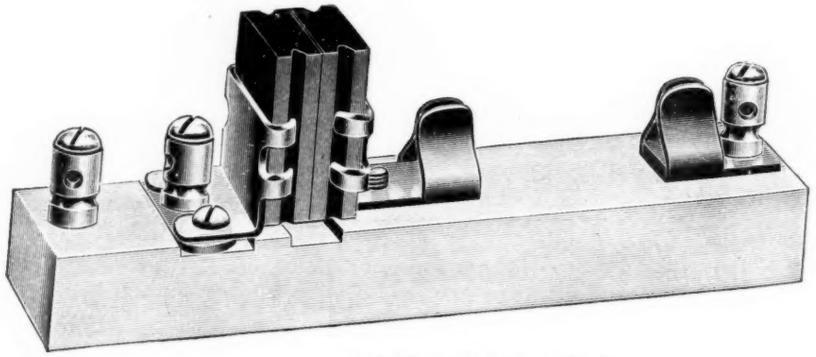
APPLETON ELECTRIC COMPANY.

Mr. A. I. Appleton is treasurer and general manager of the Appleton Electric Company, Chicago. This firm is well known throughout the telephone and electrical fields as specialists in the manufacture of fuses, fuse wire, fuse blocks, lightning arresters, connectors, etc. For some years prior to his launching the firm which bears his name, Mr. Appleton had had practical education and training along these and kindred lines of electrical work. Few men operating in the telephone field to-day are better equipped to discern and fulfill its needs.

Referring more particularly to the line of goods manufactured by the Appleton Electric Company, it may be truthfully said that it represents a standard, high-grade class and one which is giving general satisfaction throughout the telephone field. In addition to fuses, fuse wire, fuse blocks, connectors, guy clamps and soldering irons, the firm makes a superior line of lightning arresters and cable hangers. The new No. 602 Appleton lightning arrester illustrated herewith is made in Western Union or Postal style, and is furnished with "Veribest" fuses unless otherwise specified. It has no mica pieces and is constructed with an open space between the carbons, which gives the entire carbon surface.



Appleton Cable Hanger.



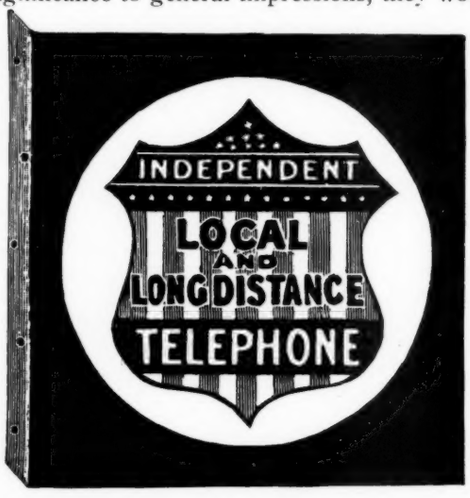
Appleton Lightning Arrester.

The carbons are adjustable from one-sixty-fourth to one-sixteenth of an inch. After lightning or a strong current has passed, it is not necessary to remove the carbon, but the line may be cleared in an instant by inserting a card between the carbons to remove the dust.

The Appleton cable hanger is advertised as the only double grip cable hanger on the market. It positively grips both ends of the strap and is quickly and easily adjusted to any size of cable. The hook is of BB galvanized steel wire and the strap is of sheet zinc. The fingers are the only tools required to hang cable with the Appleton hanger. The Appleton Electric Company maintains a New York office at 227 Fulton street.

INDEPENDENT TELEPHONE SIGNS.

If Independent telephone companies everywhere fully appreciated the importance of public opinion and attached proper significance to general impressions, they would sure-



ly buy more liberally than they have in the past of Independent telephone signs and see to it that the striking emblem of the red, white and blue shield confronted the public eye wherever Independent service is for sale.

The public would then quickly awaken to the fact that the Independents are not only progressive but numerous, and it would be common gossip on the streets, on the trains and in the homes that "the Independents appear to be growing rapidly;" that "you see their signs everywhere now," etc.

It would therefore seem good policy for every Independent company to hoist the shield at every possible point of advantage. They are not expensive and will doubtless pay for themselves very rapidly in the shape of increased revenue and general effect upon the public.

The Enameled Steel Sign Company, Hampden Bldg., Chicago, makes a specialty of Independent telephone signs. Two illustrations of the company's most popular styles are presented herewith. It will be understood, of course, that

the three colors, red, white and blue, are employed on the signs proper, whereas only the two colors, black and white, can be shown in these illustrations. The Enameled Steel Sign Company has prepared a very effective circular in colors which gives a more adequate idea of the appearance of its signs than can be given here and these circulars, together with full information, will be promptly furnished to all interested parties.

These signs are made from the official designs, adopted by the National-Interstate Telephone Association. Both sides are alike, the larger sign being seventeen by eighteen inches in dimension, while the smaller one is eight by eighteen inches. Both styles have perforated flanges so that the signs may be readily attached at right angles to any support. The company announces that it is prepared to furnish the above signs promptly from stock in any desired quantity and at money-saving prices. The firm also makes special signs to order in any desired length, up to twelve feet in one piece, and larger sizes by joining together. Any style of lettering and all possible combinations of color can be employed. For special work of this kind the company employs a staff of skilled artists to prepare sketches for prospective customers. Telephone companies in the market for signs this season are invited to correspond with the Enameled Steel Sign Company, stating their probable requirements and prompt replies will be furnished them.

VICTORY FOR THE STERLING ELECTRIC COMPANY.

By a decision of Judge Anderson of the United States Circuit Court for the District of Indiana, the Sterling Electric Company is adjudged to be the owner and has the exclusive right and title to all of Frank B. Cook's inventions covered by the patents at issue, and Frank B. Cook has no right to manufacture or sell under these patents. Eleven cases have been in the courts for something more than three years and the contest has been most stubborn. The plaintiff, Frank B. Cook, was represented by Stuart, Hammond & Sims of LaFayette and C. C. Buckley of Chicago; and the defendant, Sterling Electric Company, had for it's counsel John F. McHugh of LaFayette and C. A. Brown of Chicago.

Frank B. Cook was one of the original incorporators of the Sterling Electric Company, and at the time its factory was moved to LaFayette, was its president. On account of differences between the officers, Cook retired February, 1902, disposing of his stock, and later bringing eleven patent suits against the Sterling company, claiming that it had no right to manufacture under his inventions and patents which had been assigned for a consideration, asking for an injunction and accounting.

The Sterling company did not answer this bill of complaint, but filed a plea claiming complete ownership to all the patents in question. The case has been bitterly fought upon these lines. Judge Anderson's decision now declares the ownership, right and title to be positively and exclusively in the Sterling Electric Company; Frank B. Cook having no right to manufacture or sell these devices. The decision should have considerable significance to telephone manufacturers and users, for it places the Sterling Electric Company in control of these patents pertaining to the protector business, which, it is alleged, has become somewhat demoralized because some manufacturers were willing to take chances upon these patents being thrown open to the world. These manufacturers will now be required to make terms with the Sterling Electric Company for what they have manufactured under these patents and what they wish to manufacture in the future, for President Doolittle of the Sterling Electric Company states that the policy of his company will be one of aggression; that it will fight for the patent and legal rights and inventions involved and will prosecute and ask for an accounting from every manufacturer who has infringed them.

This decision places the Sterling Electric Company in an enviable position, so far as protective devices are concerned. The Sterling Electric Company is one of our largest and most progressive institutions, and is owned entirely by La-Fayette people. The stockholders are jubilant over this victory and predict an unusual era of prosperity as a consequence.

WARDMAN TEST CONNECTOR.

B. F. Kierneff, Jr., & Co., of Los Angeles and San Francisco, are introducing a very clever and useful specialty known as the Wardman Test Connector. This device may be used for all connections to line wires, as drops, house wires to drops, bridle wires, etc.; also makes a perfect test connection. Among the more important claims advanced for it are the following:

Simplest—Made of one piece, no loose parts, no loose connections, no soldering.

Quickest—To attach or remove. A second's work with the fingers, no screws or nuts. No delay for a hot iron or misplaced tool. Done in one-tenth the time of the old style.

Efficient—No acid-eaten or burnt wire from solder, no corrosion from loose connections. A quick strong grip that will give continuous pressure on the wire, insuring a permanent contact.

Economical—A time and money saver. Made of spring brass, practically indestructible, and sells for a very reasonable figure.

Interested parties can secure samples, prices and full particulars by addressing the firm of B. F. Kierneff, Jr., & Co. at either of its offices.

A NEW LOCK-OUT TELEPHONE.

The Select Telephone Manufacturing Company, of Springfield, Ohio, has been engaged during the past two years in developing a new type of lock-out telephone for which several distinct points of superiority are claimed, as well as great improvements in mechanical perfection and practical operation. The company has been in business at Springfield for over two years and has been placing its apparatus on the market for about eight months. During that period, the manufacturers state, they have put out several thousand machines and have over one thousand in use in the state of Ohio alone. Out of all this number they state that they have yet to receive the first instrument back. Among the leading claims advanced by the company for this new lock-out are the following:

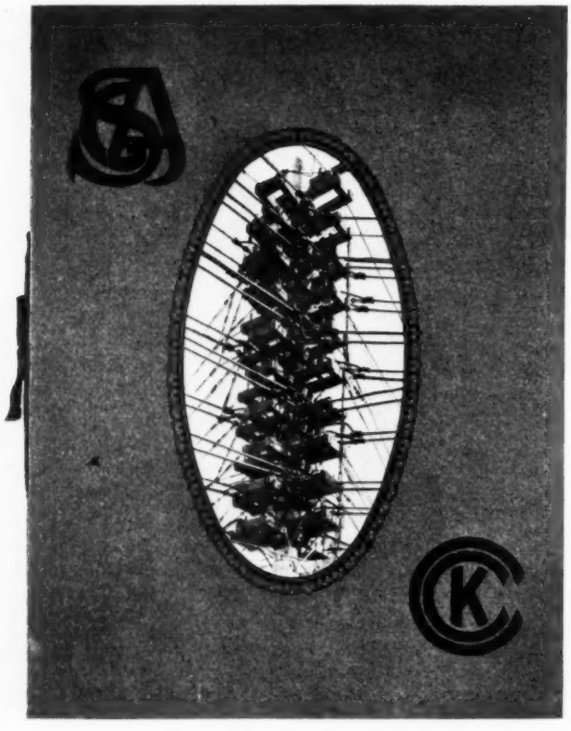
It is absolutely new. It is extremely simple in construction, positive in operation and the price is right. It requires no ground connection for its operation, using simply the two line wires. It is fully bridging in every particular and has absolutely no resistance or impedence in series with the talking circuit and does not interfere in any manner, shape or form with any of the present selective systems. There are absolutely no changes or additions necessary in the central office and as far as the operator is concerned, she need not even know that the lockout is on the line. It can be attached to any central energy telephone instrument on the market, in about fifteen minutes. In addition to this, several of the large switchboard companies, including the Dean Electric Company and the Sterling Electric Companies, are wiring telephone instruments to be used in connection with this lockout, at no additional cost to the telephone company. Under this plan, upon the receipt of the lockout, all the telephone company has to do is to mount same on the telephone and connect it by four wires which are, as stated above, provided for. This instrument can be used on any party line with any number of subscribers, there being no limit at all to the number that can be placed on one line.

The Select Telephone Manufacturing Company is incorporated under the laws of the state of Ohio for $60,000. Jas. S. Brailey, Jr., is president and C. D. Juvenal, who has built a good many exchanges in the state of Ohio,

is secretary and treasurer. The position of vice-president and general manager is held by W. M. Bruce, Jr., who is also the patentee. The company has been extremely successful so far and business is coming at a faster rate each month.

AN ATTRACTIVE CATALOGUE.

The 1906 catalogue of W. N. Matthews & Brother, 203 North Second street, St. Louis, contains 32 pages beautifully illustrating the advantages of the Stombaugh guy anchor and the Kearney cable clip by numerous half-tone cuts. The accompanying illustration shows the cover, the



Cover of W. N. Matthews & Brother 1906 Catalogue.

original of which is in three colors, pleasingly designed and well printed. The catalogue should prove of interest to telephone, electric light and street railway companies, as it contains interesting data pertaining to the construction of pole lines. It will be mailed on request.

PHONOGRAPH ANSWERS TELEPHONE.

"Science has made amazing strides in the past decade, but the latest use to which the phonograph has been put is the greatest thing I have seen for years," declared Adam Marks of Pittsburg.

"The use of the machine for the dictation of correspondence has become familiar to all, but it remained for a New York genius to install a machine as an office boy. Last week I was in New York, and called up a friend of mine over the telephone. I was startled at hearing a squeaky voice answer the telephone with these words: 'I am the phonograph; Mr. Burton will not be back until 4 o'clock; give me your message.' My curiosity was aroused, and at 4 o'clock I dropped in on Burton to see the device which had answered the phone. It was a phonograph, all right, and was so arranged that when the operator connected his phone it would speak its piece and then record the answer of the speaker. It was most ingenious, and, Burton said, was decidedly practical, saving the expense of a boy to answer the telephone in his absence, and recording with the greatest accuracy the messages spoken into the telephone." —*Milwaukee Sentinel.*

NEW VOUGHT-BERGER BULLETIN.

The Vought-Berger Company of La Crosse, Wisconsin, is distributing to its trade bulletin No. 33, descriptive of a new express drop, a drop with which the company is having unprecedented success. This drop is of the express type, it being self-restoring. One of its novel features is a closed jack. This prevents the possibility of any dirt entering into the switchboard from the front. This drop is also novel in its armature attachment and coil removing arrangement. It is not necessary to remove any screws in order to remove the armature, or to take out the coil. All permanent connections are soldered, and remain so at all times. It is not necessary to break any connection in removing the coil.

Another novel feature of the Vought-Berger express switchboard apparatus, is the clearing-out drop. This drop automatically restores when the operator returns the plug to its socket. The company will be pleased to send its No. 33 bulletin to any switchboard user interested.

UNITED TELEPHONE STATEMENT.

The following comparative statement shows the progress of the United Telephone and Telegraph Company of Pennsylvania during the past two years:

	1905.	1904.
Rentals, tolls, etc.	$479,810	$464,249
Net earnings	219,824	180,501
Dividends, etc., received	38,704	29,367
Interest on bonds	161,590	148,995
Guaranteed dividends and rentals..	46,930	35,430
Balance surplus	50,008	25,443

The operating expenses in 1905 include: Operating, $145,847;, against $154,580; maintenance, $63,693, against $77,339; general taxes and expenses, $31,336, against $29,-215; taxes, insurance, etc., $19,109, against $22,614. The "other income" includes in 1905 dividends on stocks owned $36,270, against $27,435.

VALUE OF TELEPHONE DIRECTORY.

"I want to look at your directory a moment," he said to the drug clerk, as he started for the telephone booth.

"The directory is over in that corner," was the answer, as the attendant indicated an entirely different direction.

The other caught up the telephone book and, after a glance through its pages, made a note and started out. On the way he paused at the soda fountain for a drink, and explained to the clerk.

"The telephone book is the only directory that is absolutely correct and made so every three months. Now I'll wager that you have an old directory on that stand."

"Yes, assented the clerk. "It is the one for 1903."

"Precisely, and my friend moved up this way some four months ago. If I had looked in your directory I should have been sent to Harlem, but I knew he had a telephone and the quickest way to find him was through the telephone book. Even the latest directory would not have that address."—*New York Sun.*

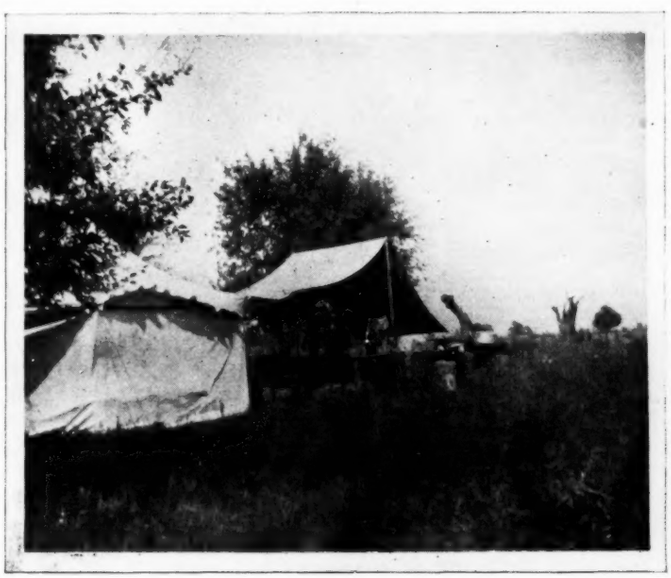
THE TELEPHONE.

If there is a rural telephone in a community, and Smith calls up Jones, they can hear at least a dozen receivers come down on the line. Patrons on the same line want to hear what Smith has to say to Jones. This was the custom in the country near Findlay, Ohio, and two men who wanted to break a woman by the name of Mrs. Martin Jaqua, of the habit, remarked when they were sure she had taken down her telephone, that it was too bad about Mrs. Jaqua's sister dying so suddenly. Mrs. Jaqua heard and dropped dead herself. This is an incident that has a double-barreled moral.

SIGNAL CORPS, NATIONAL GUARDS

By George Rice

THE signal corps of the modern National Guard is practically a new institution. Previous to the Spanish-American war, the signal corps men were detailed from the different organizations that happened to be in the camp. The signaling was done with flags in the daytime and lights at night. But little improved electrical apparatus was used. The modern corps is made up of specially selected officers and men who are trained in electrical devices, and the various systems of signaling. The necessary telephone and telegraph equipments may be found as a part of the property of the present field corps. The writer participated in the several National Guard encampments last season, including the Indiana and Ohio encampments. The signal corps organizations in these states, like those of a number of other states, are to-day about as near perfection as the signal corps of the regular army. The Government sent officers of the regular army into the camps with the National Guardsmen for the purpose of giving information.

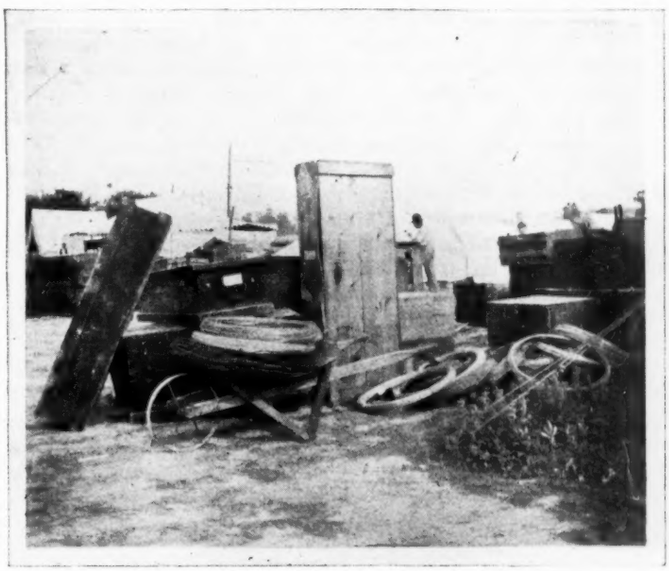


Mess Tent.

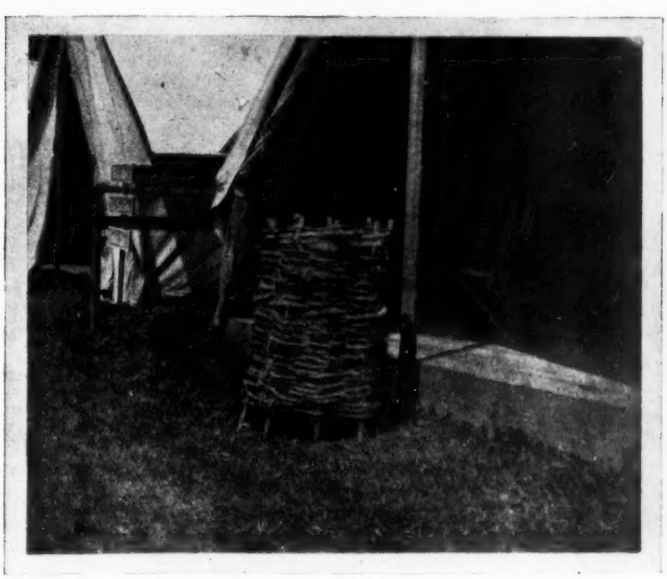
The tours resulted in the militiamen adopting many of the improvements of the regular establishment. I observed that in practically every case the corps consisted of selected and experienced men. Some of the officers and men had served in the signal or engineering corps in the Philippine Islands.

Others, in private life, are engineers, electricians, telegraph operators or engaged in some similar profession. Before the man is chosen for the service, he is put through a severe physical examination, and if he passes that, he is examined for his knowledge of electrical science. He must have mechanical ability, ingenuity and patience. He must be able to receive and send messages. Though he may be only a lineman, he is required to be familiar with the telegraph instrument. In the regular army there are first and second class privates in the corps, and, as a rule, many of the second class privates are not telegraph operators when they enlist. They "take on" as linemen, and gradually learn the art of telegraphing.

My experience with the National Guardsmen was that every man was willing to work, carry a spade, drive stakes, send messages, go out in storms and at night to erect fallen poles and wires, and obedient to superior officers. Throughout the summer tours they carried their lines and instruments to the front with them, and in every case the communication was always maintained between the advance and rear of long columns by the activities of the signal corps. The game of war was played for a few days in each tour. The signal corps men were subjected to the same conditions as if actual war prevailed. The different sides wore different suits. There was the "blue" side and the "grey" side. Signal corps men of one color were captured by wearers of the other color and held as prisoners of war. The signal corps man is necessarily exposed, because he often takes to



Some Homemade Property.



Signal Corps Property in the Field.

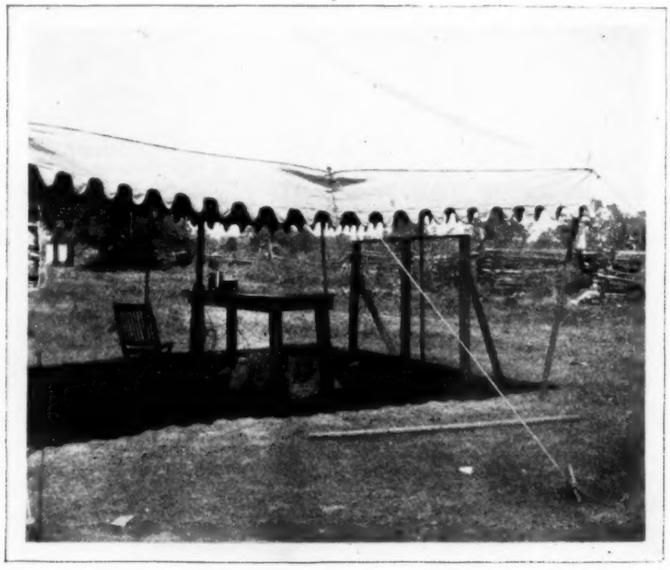
a hill, for signaling purposes, and gets cut off by the scouting parties of the foe. There is much real hard work experienced in these tours. From the day that the campaign begins, it is work, work, for the signal corps. The property of the corps includes electrical apparatus, flags, lanterns, tentage, mess kits, and in last season's tours, actual outfits of telephone chests, full size, portable, and used in the field. This property is kept at the headquarters of each National Guard, as, for example, at Indianapolis, for the National Guard of Indiana. The various pieces transported to the field each season have to be accounted for and returned. A remarkably full complement is maintained by many of the states. The heliograph and other modern devices are in readiness for immediate service with men trained in the use of each instrument. The corps goes in the field with the intention of remaining there as long as needed. The proper cooks are detailed as soon as the camp is established, and a substantial mess is provided. The regular army ration is drawn and each man subsists upon the ration. The officers have a mess of their own, as the Government does not issue food for an officer either in the field or in garrison. The officers hire a cook, and provide the cook with money with which to buy subsistence stores. When the "hike" comes, the men draw their field ration for one day, two days or three days. The officers put up their packs of ration, and all are ready for the expedition. The country usually selected by the judges is hilly and traffic is difficult.

During the progress of the Ohio encampment a severe storm struck us in the hills, and the temporary lines established by the corps men were torn down, only to be put up again and again. Several corps men were injured. The trails had to be followed and all broken poles and lines restored while the rains fell heavily and the storms raged.

Signal Corps Tent.

It was real warlike experience for the men, and they stood the test well.

As to the organization of the modern signal corps of the National Guard, it is very similar to that of the regular army. There is a chief signal officer in supreme command. Sometmes he also commands the engineering corps. The signal corps and the engineering corps usually camp together and work together. The chief signal officer has the rank of general, colonel or major. Then there are a number of company officers, with rank of captains and lieutenants. Next are the non-commissioned officers, ranking as first class sergeants, second class sergeants, corporals, first and second class privates. Each state has a corps of from fifty to two hundred men. Necessarily the officers and non-commissioned officers have to be competent at mathematical problems. There are difficult and complicated situations both in theory and practice to work out on paper before put into practice. Plans have to be made the day ahead. Sometimes a line of communication has to be sustained with an advancing column, and the wire is strung over the ground. Or perhaps the line is to be used several days, in which case light, handy poles are hastily erected. These are pointed, and two men can press the point into the ground far enough to hold the pole steady. In the regular service the men are trained to be agile. Trees have to be



Signal Station Ohio National Guard.

climbed for observation purposes, and sometimes to attach a wire. Skill is needed in going up poles to tap wires, etc.

The National Guard in recent years has chosen men light in weight, and possessing the necessary strength and agility to perform difficult feats in emergencies. Then, again, the man has to be ingenious. All sorts of things are constantly happening to the apparatus in transportation, and all sorts of ways have to be adopted to repair defects. Finally, the signal corps man is drilled enough to make him familiar with the rifle, to form, to march, to take part in a parade, and to protect himself in action. He may have guard duty to perform now and then and he inspected like the other soldiers, to see that his equipments are clean and in order.

TELEPHONY ON THE CONTINENT.

Herbert Laws Webb, the London engineer, recently made a month's trip on the Continent, devoted chiefly to looking into telephone progress. He visited Antwerp, Brussels, The Hague, Amsterdam, Rotterdam, Berlin, Munich, Berne and Paris, and inspected the telephone work and exchanged views with the telephone officials at those places. No very rapid development in the extension of telephony is, he states, occurring in any of the continental countries, but the adoption of message rates in Germany has materially improved the rate of telephone development in that country, both in small places and in the large cities. The Berlin plant is being entirely reconstructed on the common battery system. In general, all new work on the Continent is being done on this system, and with but one exception all the large continental telegraph administrations have adopted it, and are not extending or reconstructing exchanges with magneto systems.

AN AUSTRIAN INDUCTIVE TELEPHONE TRUNK LINE

THE London Electrician publishes an interesting article by Herr R. Nowotny which appeared in the Vienna *Zeitschrift für Elektrotechnik* some time ago describing a successful experiment made in Austria on the insertion of inductance coils in long telephone lines. The line in question is from Vienna to Innsbruck, a distance of 354 miles, and, being a new one, it was designed from the outset on this system. According to past experience, a four millimeter (0.1575 in.) bronze wire would

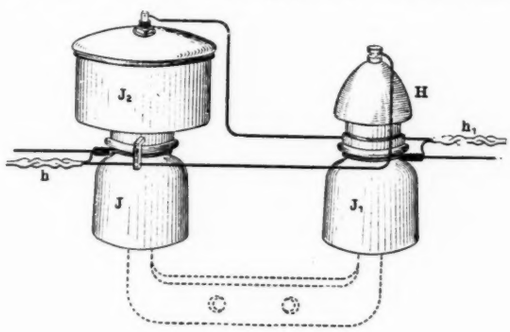


Figure 1.

have been necessary on the ordinary system, while it was anticipated that three millimeters (0.1181 in.) would be sufficient diameter for the wire if inductance coils were inserted at intervals; this represented a considerable gain in economy.

For the greater part of the route, the existing poles of the telegraph and telephone administration could be utilized for the new line, only thirty-three miles of new pole route being required. The first 6.4 miles of the line were formed by a pair of wires in an existing paper insulated underground cable, and there are three other lengths of cable on the route, one one and three-quarters miles in length, the second about the same length, and the third 220 yards long. Inductance coils were employed in all the cable sections, with the exception of the 220 yards length, as well as on the overhead line.

The overhead wire itself was erected in accordance with the usual practice of the Austrian telephone administration for inter-urban work. This implied crossing the two wires of the pair generally at every eighth pole. The wire is of bronze, 3 millimeters (0.1181 in.) diameter, except in some Alpine districts in which a compound wire was employed three millimeters in diameter and with an absolute breaking

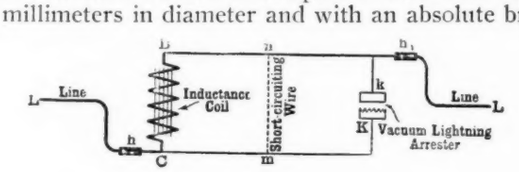


Figure 2.

strength of 1,170 pounds. In some places also it was necessary to employ a lighter wire, two millimeters (0.0787 in.) bronze or compound.

The coils for the overhead line had each a resistance of 1.2 ohms, and an inductance of 0.08 henry, and they were placed at distances of four kilometers (2½ miles) apart on each wire of the loop. To carry the coils it was found possible to employ the pattern of bracket and insulator used by the Austrian telegraph service for branchings with but little alteration. The method of supporting the coil is shown in Fig. 1. The insulators J and J_1 carry the line wire. On J there is a pot-shaped insulator, J_2, in which the inductance coil is embedded in paraffin, while on the second insulator J_1 is fastened an ebonite bell, H, containing the vacuum lightning protector, which is shunted to the inductance coil. It was necessary to erect the line first without the inductance coils, as the latter were not ready for delivery. In order to save soldering the joints when the coils were subsequently inserted, sleeves were employed on the Arld principle. These are short copper sleeves for two millimeter or three millimeter wire, which are passed over the ends of the wires at *h* and h_1, and then twisted round the wire from the middle outwards by means of a special tool. Fig. 2 shows diagrammatically the connection of the inductance coil and lightning arrester. The dotted line repre-

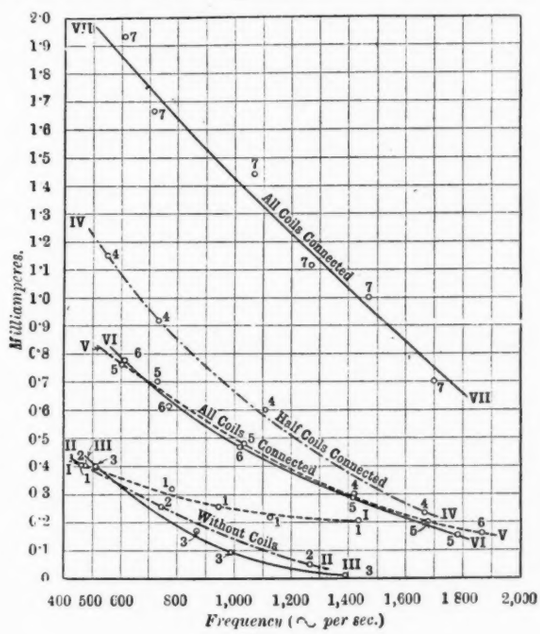

Milliamperes.
All Coils Connected
All Coils Short Connected
Half Coils Connected
Without Coils
Frequency (~ per sec.)
400 500 600 800 1,000 1,200 1,400 1,600 1 800 2,000

Figure 3.

sents a short-circuiting wire, which was employed for the tests described later.

The inductance coils on the cable part of the line differed to some extent from those on the overhead line, the two coils on the two wires being wound upon the same iron core in this case, while on the overhead line the coils on the two wires were separate, each being contained in its own insulator pot and each being provided with its own lightning arrester. The resistance of the double coils on the cable was 2.5 ohms and their inductance 0.2 henry. These coils were spaced at distances of 1,250 meters (1,370 yards) apart, and it was so arranged that they were placed at the ordinary joints in the cable, the junction boxes being made sufficiently roomy to take the coils also, and the work of adding the coils to the wires used for the new line did not interfere with the continuous working of the other wires of the cables.

In the first instance, speaking tests were made with all the coils on the overhead line short-circuited—the few coils in the underground lines were left in. It was found possible to speak between the Vienna and Innsbruck exchanges with

some difficulty, and even to speak from an instrument connected directly across the line at Vienna to single-wire subscribers at Innsbruck. It was not found possible in most instances, however, to enable subscribers in Vienna to talk with subscribers in Innsbruck. An experiment was then tried to ascertain the effect of the 10.3-kilometer (6.4 miles) cable at the Vienna end of the line. This was replaced with a cable of the same length and size not equipped with inductance coils, and there was then a distinct weakening of speech. The same conclusion was come to by using part of the new line, between Vienna and Salzburg (303 kilometers; 188 miles) in connection with the coil-equipped cable and comparing it with another telephone line between the two points. Although one-third of the latter line was of four-millimeter wire and two-thirds of three-millimeter wire, and the new line was of three millimeter for its whole length, as already stated, the new line gave clearer speaking than the old.

The next test was made on the entire length of the new line from Vienna to Innsbruck, but with every second inductance coil short-circuited on the overhead part, so that the coils were only connected in every eight kilometers (5 miles). It may be mentioned that speaking tests were also carried out during the process of removing the short-circuiting wires, and it was found that after this work was commenced, and the inductances were, therefore, connected irregularly, speaking on the line became much worse, the voice sounding muffled, with an absence of sibilants; but as the work of connecting in the coils proceeded, speech improved. Tests then carried out—with the inductance coils at eight-kilometer (5-mile) intervals—showed that loud and clear speech was possible between two towns, and that subscribers could be connected with very good results. When the mouth was fifty-seven centimeters (22½ in.) from the microphone at Innsbruck words spoken with ordinary loudness could be heard in Vienna. It was even possible to speak between Innsbruck and Cracow (1,000 kilometers; 621 miles), although the voices then became very weak, but on extending the line further, to Lemberg—1,350 kilometers (838 miles) from Innsbruck—speech was no longer possible.

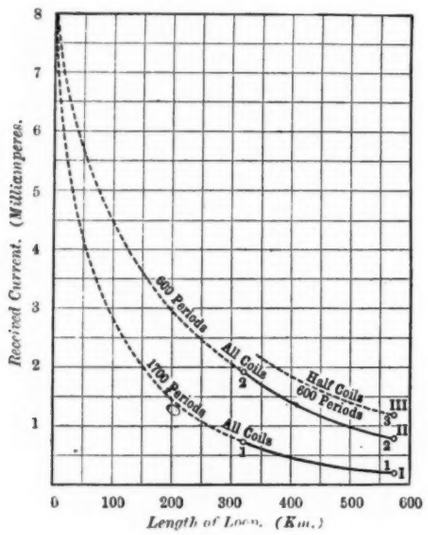


Figure 4.

The remaining short-circuiting wires were now removed, so that the inductance coils were only spaced at four-kilometer (2½-mile) intervals. It was found that the improvement in speech between Innsbruck and Vienna was quite insignificant, and the only result was slightly better speech between Innsbruck and Cracow; it was still impossible to talk from Innsbruck to Lemberg. Moreover, when tests were made as before to see what distance the mouth could be removed from the microphone mouthpiece without rendering speech unintelligible, the same result was obtained as with half the inductance coils in use.

A comparison was also made between the new line and a four-millimeter bronze line from Vienna to Trieste, 321 miles long—that is to say, of almost equal length. Speaking was equally good over the two lines in spite of the difference in sectional area. As it will be necessary in practice to interconnect the existing non-inductive lines with sections of the new line, a speaking test was made from Salzburg to Trieste, using the new line from Salzburg to Vienna (188 miles) and the four-millimeter line just mentioned from Vienna on to Trieste. The result was all that could be desired, and it was possible to hear well at Trieste when the mouth of the operator at Salzburg was 7¾ inches from the microphone mouthpiece. Similar tests were made with other lines in conjunction with the new one, and the results were satisfactory in every case.

While all these experiments were being carried out, an endeavor was made to obtain some quantitative results with the aid of high-frequency currents. Currents of eight milliamperes at different frequencies were sent into the line at the Vienna end, and the received current was measured at Innsbruck and Salzburg with the aid of a mirror galvanometer. The results of these measurements are shown in Fig. 3. Curves I to VI apply to the whole 354 miles from Vienna to Innsbruck, and Curve VII to the part from Vienna to Salzburg only (188 miles). During the tests with the coils all short-circuited, shown in Curves I, II and III, the insulation resistance per kilometer of single conductor was 41.5, 25.5 and 18.5 megohms per kilometer respectively. Curve IV gives the results with half the coils only in circuit, and during this test the insulation resistance was 46.5 megohms per kilometer of single line. Curves V and VI, which, it will be seen, are for the line with all the coils in circuit, were taken when the insulation resistance was 12.25 and 9.5 megohms respectively per kilometer of single line; and the part of the line from Vienna to Salzburg had an insulation resistance of twenty-five megohms per kilometer of single line when Curve VII was taken.

The increase of the received current when the coils are in circuit is apparent from these curves, and it is also seen that this is less marked the higher the frequency. This would indicate a considerable weakening of the over-tones of the voice, which, however, was not observable in practice. The author ascribes this partly to the impedance of the receiving apparatus, and partly to the fact that larger currents have to be used for the quantitative tests than for actual telephony, while the inductance of the coils is calculated for the telephoning conditions.

The most noticeable feature in the curves, however, is the fact that larger currents were received when only half the coils were in use, this being the more marked the lower the frequency. The paper concludes with a theoretical investigation as to the effect of the insulation upon the working of the line, from which it is concluded that, in damp weather, when the insulation resistance of the line is low, there should be little difference in the effect of coils spaced at four kilometers and coils at eight kilometers apart. As in the tests under the former conditions the insulation resistance of the line happened to be lower, the author concludes that the theoretical and practical results are in agreement.

Fig. 4 shows the relation between the received currents and the length of the line, based on measurements taken over the complete line, 354 miles long, and on the part from Vienna to Salzburg, 188 miles long.

The Italian Ministry of Communications has just officially approved the projected substitution of the telephone for the telegraph on the Castel Raimondo—Camerino railway. This is the first change of the kind to be made in Italy.

HUMOROUS TELEPHONY

Stories and Anecdotes in a Lighter Vein

WHEN the bells on a rural telephone circuit began merrily jingling one June morning half a dozen young women in as many farmhouses forsook everything else, and with paper and pencil before them took up the receivers. It was the agreed time for a review of ancient history, prior to the final examination in the "consolidated" high school on Monday.

"I say, girls," came the first voice when all were ready, "what does anybody know about Moses?"

"Oh, that's easy, Henrietta," was the answer along the line. "Born 1738, went into exile 1698, came back to Egypt 1658 and led the Hebrews out of bondage. He died when he was a hundred and twenty years old."

"Please say those dates again, Ethel."

"Seventeen-thirty-eight, sixteen-ninety-eight, sixteen-fifty-eight."

"Aren't you saying them backward?"

"Why, no, stupid. It's B. C."

"That's 'Backward Counting,' you know, Henrietta," interrupted a third voice.

"Oh, yes, of course. I ought to have known. But say, girls, that's just what I want to know about. How do they do it?"

"Do what?"

"Why, keep track of what year it was when they had to count backward. Do you suppose Moses knew how old he was going to be when he died, and kept saying, 'I was a hundred and twenty when I was born, in seventeen-eighteen I'll be a hundred—' and so on till he died?"

"Of course not. They counted their ages forward."

"What I want to know," said voice number four, "is how they knew what year to begin to count with. Now of course we are adding a figure every year. We started with the year one. This is nineteen five, of course, and next will be nineteen-six. But how did those old-timers know in seventeen-thirty-eight B. C. that it was going to be just that many years to the year zero, or to whatever they called it before our reckoning began?"

Into the transmitters of half a dozen telephones and along a dozen miles of wire was launched a confused murmur of exclamation and query. At last it quieted down when the calm voice of Henrietta was heard coming down the line.

"Oh, I can answer that one myself, girls," she said. "It was started that way, and all they had to do was to keep track. It's marked here in the Bible that Adam was born in four thousand and four, and, of course, then, all he had to do was to subtract one every year. It was bound to come out even."

Messrs. Watt and Knott engaged in a conversation over the telephone with the following result:

"Are you there?" "Yes."

"Who are you, please?" "Watt!"

"What is your name, please?" "Watt's my name!"

"Yes; what is your name?" "I say my name is Watt!"

"Oh! Well, I'm coming to see you this afternoon." "All right. Are you Jones?" "No; I'm Knott."

"Who are you then, please?" "I'm Knott!

"Won't you tell me your name, please?" "Will Knott!"

"Why don't you?" "I say my name is William Knott."

"Oh, I beg your pardon."

"Then you'll be in if I come around this afternoon, Watt?" "Certainly, Knott."

They were rung off by the exchange. Now, what Knott wants to know is whether Watt will be in or not.

The great convenience of the private residence telephone was well illustrated the other day in a house where one has just been installed. It was about 6 o'clock in the morning when the woman of the house heard the telephone bell ringing with such persistency and violence that she got up and hastened to it without stopping to do more than don a dressing gown.

Wondering all the time who could be calling so early in the morning, she took down the receiver and said the usual "hello" with as much unconcern as she could muster. Her anxiety was changed to disgust when the answer came back, "Hello, there, Kate. Got your washing done yet? I had mine done and hung out an hour ago."

This story comes from Marengo, Illinois, and is said to have been an actual occurrence there:

One stormy night this spring a certain doctor of Marengo was called up by a rural resident, who had urgent need of his professional services. The doctor had heard that the resident referred to was very poor pay and declined to go out in inclement weather unless insured of cash in hand. Verbal assurances were given by wire, but still the doctor had his doubts. Finally the would-be patient wailed forth:

"Why, doc., I've got the money in my pocket, now."

"Let's hear you jingle it, then," retorted the doctor.

The clink of three silver dollars came back by wire and the physician hastily donned his raincoat, hitched up a horse and was off for the suburbs.

Because women cannot vote in the conservative state of Maryland does not bar them from taking a very active interest in the election, and they all—each and every one—have their politics. They might not know just why they embrace certain views, but then, it is a question whether the men know so very much along this line, either.

One woman walked down one of the business streets in Baltimore on the afternoon of the day when the masculine members of society were exercising their rights as American citizens, and came to three telephone poles supporting three gentlemen who had partaken too freely of the cup that inebriates.

"I have always believed that all wires should be placed underground," she said reflectively, "but I am beginning to think that idea is a wrong one. I am beginning to see the great use of telephone poles."

Telephones are handy, not alone from a business standpoint, but from social as well. For instance, you can call a man a liar and if you hurry you can hang up the receiver before he calls you another. Then again, if a fellow calls you up and you feel grouchy you can call him down without being afraid of getting stung. But the best of all is the purpose they serve on a rainy day, that prohibits a conversation across a backyard fence, or short calls. A visit of this kind was recently transcribed in shorthand for us (and it puzzled the stenographer to get it all then). As near as she could figure from her notes this is about the way the breezy chat was carried on:

"Hello. Thought I'd never get you—these telephone girls are away on a vacation half the time. Yes, I'm gettin' sup-

per and only got a half minute to spare. Isn't this a horrid day?—had on my old wrapper all day and look like a churn dressed up in a gunny-sack. Oh, ain't that nice! Guess my potatoes are burning. Who's that you say? A boy? Good for them. Everybody gets silk. Going to spring mine on Easter. Oh, box plaits down the back and lace yoke—don't tell, for it's the latest. In the Ladies' Home Journal. Just as I expected—bet they never will be if they put it off very much longer. Guess my potatoes are having a warm time of it. Oh, well her folks don't like him anyway. She's got a new girl. She makes me tired. He is to be pitied, poor fellow. Oh, I never tried that. If I had her walk I'd try and get it fixed.

"Yes, there's enough sales in town to rig a schooner. Got a pair for nineteen cents—it's cheaper to go dressed up than not. What's that? Come away! I know what she uses. There is more hot air about her than you can get out of a coal stove. Ain't he thin? Cup of milk, two eggs. Feel as though I'd been to the laundry and got done up. I'm dying to see you. How lovely! She always talks like that. Don't tell anybody, I never do—not even my own husband. Sakeslive! It's not all her own by a long shot. No, brown eyes. Don't tell. She makes me weary. Force. You don't say. Presume every hired girl in town will have one. Plaited down the back and lace yoke. Don't tell!! Did you vote yesterday? I did—well, all right—oh, my pota—Good-bye."

All this in five minutes! All inventions must take a back seat for the telephone.

The invention of the "seeing telephone" is responsible for the following:

Ting-a-ling! Ting-a-ling!

The telephone was ringing. Yet it was 8 a. m.

Ting-a-ling! Ting-a-ling-ling-ling!

The society belle was very sleepy, but there was nothing to do but climb out of bed and answer it.

"Hello!" she called crossly.

"Hello! Is that you, Grace?" called her sweetheart. "Yes? Excuse me for ringing you up so early, but I've got to go out of town in an hour."

"It's all right," replied the girl, kindly. "What is it, George?"

"Why, you see, there's an agent here with one of these new-fangled patent seeing devices for telephones. Enables you to see the person you're talking to, you know, so I'll have him put it right on, eh?"

There was a maidenly shriek and a mad rush into the adjoining room, and a few moments later the young lady's mother came to the telephone and told George he'd better ring off.

Among the multitudinous lines of business that occupy the time and attention of American and other civilized peoples, there is, perhaps, none so productive of humorous incidents as the telephone industry. Of late years—particularly since the advent of the rural telephone—the crop of telephone stories has grown until one can hardly pick up a paper or magazine that does not chronicle some amusing incident in connection with the "hello" business—in fact, the "telephone joke" has come to be looked upon as a stand-by of the humorist—a friend that he can fall back upon at all times with the assurance of drawing therefrom the material for a smile.

An anecdote which shows the value of the telephone as a reformer was related by Congressman Bingham of Pennsylvania at a dinner recently given by the Philadelphia Clover club and at which he was a guest of honor.

"The world is growing better," he said. "Daily it becomes cleaner, kinder, and more upright. Nearly everything makes for reform. Even the telephone has a tremendous reforming influence.

"Let me give you an example of the surprising effect that the telephone exercises over our morals.

"A certain man, at breakfast one morning, said to his wife:

" 'My dear, I'll not be home to dinner to-night and you had better not sit up for me, as I shall be detained very late at the office posting my books.'

" 'Very well,' the lady answered. 'Before I go to bed I'll say good night to you over the telephone.'

"The man had forgotten, you see, that a telephone connected his office and his house."

As showing how handy the telephone is the case is related of a Chicago young woman who was called to the telephone the other afternoon. A girl friend at the other end of the wire pleaded earnestly with her to come right over. Filled with apprehension the girl made haste. Gaining admittance to her friend's apartment, she was startled to find that young woman attired in her nightrobe and a handsome beaded collar. "I came home sick," she explained tearfully, "and wanted to go to bed, but I couldn't get this horrid collar off, and there was no one here in the flat to help me." In two minutes the hooks and eyes were released and with a sigh of relief the young woman crept into bed.

In a southern city recently an Independent telephone company had a large force of laborers at work laying conduits for a new underground system. An old darkey, after eyeing the conduit meditatively for several minutes, said: "Dey's a-fixin' to run liquor along under the groun' so dey can't cotch 'em so easy. I'se a-gwine to look fur de end whar it comes out."

Mr. Miggles was trying to call up a friend who lived in a suburban town. Mr. Miggles looked up the number, then got central.

"Hello," he said, "give me Elmdale two-ought-four-seven."

"Elmdale? I'll give you the long distance."

Long distance asked, "What is it?"

"Elmdale, two-ought-four-seven."

"Elmdale, two-ought-four-seven?"

"Yes."

"What is your number?"

"I just told you. Elmdale two-ought——"

"O, that isn't what I mean. Your 'phone number."

"Why didn't you say so?" asked Mr. Miggles, who is noted for his quick temper.

"I did. What is it?"

"Violet Park eight-seven-seven."

"Violet Park eight-double-seven?"

"I reckon so."

"And what number do you want?"

"Elmdale two-ought-four-seven."

"What is your name?"

"My name is John Henry Miggles. I live at 65 Blicken street, Violet Park; my house 'phone is Violet Park eight-seven-seven, or eight-double-seven, as you choose; I am married, have no children; we keep a dog and a cat, and a perpetuated palm, and a Boston fern, and——"

"All that is unnecessary, sir. We merely——"

"—and last summer we didn't have a bit of luck with our roses; tried to have a little garden, too, but the neighbors' chickens got away with that; the house is green with red gables; there is a cement walk from the street; I am 40 years old; my wife is younger, and looks it; we have a piano; keep a cook and an upstairs girl; had the front bedroom papered last week and I want to——"

"Did you want Elmhurst two-ought-four-seven?"

"Yes!" gasped Mr. Miggles.

"Well, the circuit is busy now. Please call again."

But Mr. Miggles wrote a letter.—

PROGRESS OF THE MONTH

Compiled by H. A. Downey

NEW COMPANIES

BENTON, Kans.—The Benton Telephone Company has been incorporated.

STEELE CITY, Neb.—The Steele City Telephone Company has been incorporated.

LONG ISLAND, Kans.—The High Line Telephone Company has been incorporated.

SABETHA, Kans.—The Burlington Telephone Company has been incorporated. Capital stock, $30,000.

LOWRY, Minn.—The Lowry Telephone Company has been incorporated with a capital stock of $6,000.

STARBUCK, Minn.—The White Bear Telephone Company has been organized with a capital stock of $8,000.

THURSTON, Neb.—The Farmers' Independent Telephone Company has been incorporated at this place.

ALBURGH, Vt.—The Alburgh Telephone Company has been incorporated with a capital stock of $2,000.

CLAYTON, Mich.—The Clayton Telephone Company has been incorporated with a capital stock of $1,000.

HOXIE, Kans.—The Spring Brook Telephone Company has been incorporated with a capital stock of $1,000.

HARGRAVE, Kans.—The Farmers' Telephone Company has been incorporated with a capital stock of $4,200.

CORTLAND, Neb.—A new telephone company has been formed at this place with R. H. Oltman as president.

GARNET, Kans.—The Garnet Telephone Company has been incorporated with a capital stock of $25,000.

SYRACUSE, Kans.—The Gear Creek Telephone Company has been incorporated, with a capital stock of $1,000.

HOLTON, Kans.—The Osage Valley Mutual Telephone Company has been incorporated. Capital stock, $25,000.

LIBERAL Kans.—The Liberal-Hugoton Telephone Company has been incorporated with a capital stock of $415.

ASSARIA, Kans.—The Assaria Mutual Telephone Company has been incorporated with a capital stock of $6,000.

FORMOSA, Kans.—The Formosa Mutual Telephone Company has been incorporated with a capital stock of $7,500.

BUNKER HILL, Kans.—The Bunker Hill Telephone Company has been incorporated with a capital stock of $12,000.

OSAGE CITY, Kans.—The Osage City Telephone Company has been incorporated with a capital stock of $12,000.

ATHOL, Kans.—The People's Telephone Company has been incorporated at this place, with a capital stock of $5,400.

TOPEKA, Kans.—The Benton Telephone Company of Hodgeman county has been chartered with a capital stock of $1,000.

DODGE CITY, Kans.—The Dodge City Wheat Belt Telephone Company has been incorporated with a capitalization of $550.

COURTLAND, Va.—The Courtland and Waverly Telephone Company has been incorporated with a capital stock of $5,000.

WILKESBARRE, Pa.—The Lucerne and Columbia Telephone Company has been incorporated with a capital stock of $10,000.

BEAUFORT, S. C.—The People's Telegraph and Telephone Company has been incorporated with a capital stock of $15,000.

OAKES, N. D.—The Hample-Crete Telephone Company has been incorporated near this place with a capital stock of $50,000.

AURORA, S. D.—The Vermillion Telephone Company of Miner County has been incorporated with a capital stock of $5,005.

HUDSON, Kans.—The German Valley Telephone Company has been incorporated at this place, with a capital stock of $1,000.

BLANDFORD, Mass.—The Blandford and Chester Mutual Telephone Company has been organized by A. L. Lewis and others

OKOLONA, O.—The Farmers' Mutual Telephone Company has been incorporated by F. H. Heilman, Isaac Durham, and others.

YELLVILLE, Ark.—G. A. Ward and associates have incorporated the G. A. Ward Telephone Company with a capital stock of $15,000.

ALLEGANY, N. Y.—The Citizens' Telephone Company has been organized at this place by C. L. McGavern and Clair S. McGavern.

MOUND VALLEY, Kans.—The Mound Valley Telephone Company has been incorporated with a capital stock of $3,000. The officers of the company are as follows: President, A. P. Sanders; vice-president, J. A. Wise; secretary, W. N. Humphrey; treasurer, Dan T. Park.

OLD FORT, O.—A movement is on foot for the organization of an Independent telephone company to be known as the Farmers' Mutual.

KINGSLEY, Mich.—A farmers' Independent telephone company has been organized at this place, with about 1,000 subscribers at the start.

KNOX, Ia.—The Knox Mutual Telephone Company has been incorporated with a capital stock of $10,000 by E. S. Murphy and others.

TEDROW, O.—The Tedrow Company has been incorporated by S. M. Stevens, A. W. Barton, W. E. Barton, H. Gasche, and C. S. Dennis.

WINNEBAGO, Wis.—W. H. Keith, James McNair and Frank Colahan have incorporated the Burritt and Winnebago Telephone Company.

HONEY CREEK, Ia.—The Honey Creek Telephone Company has been organized with G. W. Cronbaugh president and Wm. Schraeder secretary.

WODEN, Ia.—The Lake George Telephone Company has been organized at this place with Thomas Quinn president and A. Orthel secretary.

THURSTON, O.—The Buckeye Lake Home Telephone Company has incorporated with a capital stock of $10,000 by W. F. O'Gara and others.

ST. JOHNS, Mich.—The Ovid Mutual Telephone Company has been incorporated with a capital stock of $5,000. E. B. Carpenter is president.

BURLINGTON, O.—The North Kenova Telephone Company has been incorporated with a capital stock of $1,800 by A. O'Neil and O. M. Elkins.

EAST HANOVER, Pa.—The East Hanover Telephone Company has been incorporated with a capital stock of $5,000 by Samuel Fry of East Hanover.

PRIMGHAR, Ia.—The Primghar and Center Township Telephone Company has been incorporated with a capital stock of $500 by J. C. Mies and others.

FLORA, Ill.—The Flora Telephone Company has been incorporated with a capital stock of $20,000 by F. G. Myers, J. B. McFarland, and W. A. Karr.

ELBA, Ill.—The North Elba Telephone Company has been organized with F. E. Potts president, Richard Murphy secretary, J. C. Breece treasurer.

RICHLAND, Ore.—The Eagle Telephone Company has been incorporated with a capital stock of $840 by E. A. Whittier, W. L. Gover and F. G. Jasper.

VANCOUVER, Wash.—The East Mill Plain Telephone Company has been incorporated with a capital stock of $750,000 by W. A. Gates and others.

NORTH STAR, O.—The North Star Telephone Company has been incorporated with a capital stock of $20,000 by W. A. Roll, Job Cosler, H. J. Burns.

VANDALIA, Ill.—The Vandalia Telephone Company has been incorporated with a capital stock of $6,000 by George C. Morris, C. Busse, F. P. Kinder.

BERWICK, N. D.—A farmers' telephone company has been formed to construct a line running north of Berwick. James Nevitt is president of the company.

ARMOUR, S. D.—The Chester Telephone Company has been incorporated with a capital stock of $1,000 by G. Fulendorf, Frank Groesbeck and others.

CHARITON, Ia.—The English Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are A. C. Curtis and others.

AMBIA, Ind.—New telephone companies are being organized at Ambia and Talbot to operate in conjunction with the West Lebanon Telephone Company.

MEDIAPOLIS, Ia.—The Square Deal Telephone Company has been organized with the following officers: President, J. B. McCray; vice president, Robert Eland; secretary, J. L. Siscoe.

THOMAS, Okla.—The Home Telephone Company has been incorporated with a capital stock of $20,000 by J. F. Gulley, W. L. McClung, A. H. Donnell, U. G. Wise, William J. Orner, Henry Helzer,

S. H. McKnight, W. E. Rogers, C. J. E. Moser, A. M. Fansler, Earl Manning.

BROOKLYN, Wis.—The Brooklyn Telephone Company has been incorporated with a capital stock of $10,000 by E. O. Wheelock, A. Crahen, Josiah Millspaugh.

WATERLOO, Ia.—The Wenkel Telephone Company has been organized with the following officers: President, Jasper Kruse; vice-president, William Wenkel.

SPRING VALLEY, Minn.—The Fairview Telephone Company has been organized and will build a line into Spring Valley. H. Brandt is secretary of the company.

CUTLER, Ind.—The Cutler Co-operative Telephone Company has been incorporated with a capital stock of $4,000 by Wm. H. Draper, Noah Plank and Wm. Smith.

WONEWOC, Wis.—The Wisconsin Home Telephone Company has been incorporated with a capital stock of $1,000 by A. E. Hunslik, M. E. Hutchins, T. A. Serruier.

WOODWARD, O. T.—The Home Enterprise Telephone Company of Woodward, with a capital stock of $10,000, has been granted a permit to do business in Texas.

GRESHAM, Ore.—The Farmers' Mutual Telephone Company has been incorporated by H. W. Shashall, Charles Clevelena, Archie Meyers and Timothy Brownhill.

AUSTIN, Nev.—Articles of incorporation have been filed by the Austin-Manhattan Telephone Company. The company will extend a line from Austin to Manhattan.

SALEM, Ill.—The Farmers' Telephone Line has been incorporated with a capital stock of $1,200 by Manson Thurman, Charles Sherman and George S. Mathews.

FARGO, N. D.—The Citizens' Telephone Company has been incorporated with a capital stock of $50,000 by F. E. Corson, C. D. Corson and E. N. Corson of this city.

MOWRY, Ariz.—Articles of incorporation have been filed for the Santa Cruz Telephone Company by H. F. Guerin, S. L. Kingan and John B. Wright. Capital stock, $10,000.

LA CROSSE, Wis.—The Electric Supply & Construction Company has been incorporated with a capital stock of $10,000 by R. J. Nihles, W. D. Burford and E. D. Burford.

MILWAUKEE, Wis.—The Signalphone Alarm Company has been incorporated with a capital stock of $100,000. Incorporators, H. C. Brander, J. H. Stauthamer, H. V. Wurdemann.

HICKMAN, Neb.—The Hickman Telephone Company has filed articles of incorporation with a capital stock of $6,000. Directors, A. Brendile, C. H. Hempel and A. Schmitte.

CUSHING, Okla.—The Cushing Telephone Company has been incorporated with a capital stock of $2,000. The incorporators are W. W. Oder, Maud Oder and Robert Oder.

FREETOWN, N. Y.—The Freetown Telephone Company has been incorporated, with a capital stock of $2,000, by D. B. Smith, B. Hall and Wilber Car, all of Freetown, and others.

FISHER, O.—The Farmers' Telephone Company has been incorporated with a capital stock of $2,500 by M. Dalton, R. M. Patterson, H. D. Hooper, Julian Gift, J. C. Harner.

FORRESTON, Ill.—The Forreston Mutual Telephone Company has been incorporated with a capital stock of $3,000. The incorporators are Henry Turndahl, H. Meiners, H. Ratmeyer.

RINARD, Ill.—The People's Telephone Company of Southern Illinois has been incorporated with a capital stock of $10,000 by J. W. Zimmerman, William Hunt and Isaac Smith.

NOBLESVILLE, Ind.—The Highland Telephone Company has been incorporated with a capital stock of $20,000. The directors are W. Albert Craig, Claude Beaver and A. H. Sheffer.

INDIANOLA, Ia.—The Stony Point Telephone Company has been organized by farmers in this vicinity. P. A. Millslagle is president of the company and J. W. Barmett vice-president.

DINORWIC, Ont.—The Gold Rock Telephone Company has been organized by Archie Campbell and will operate between Gold Rock, Wabigoon, Deyden, and the Grand Trunk Pacific.

PECKHAM, Okla.—The Peckham and Northwestern Mutual Telephone Company has been incorporated with a capital stock of $1,000 by B. H. Fisher, John W. Stewart, Fred Herman.

ROCK GROVE, Ill.—The Rock Grove Farmers' Mutual Telephone Company has been incorporated with a capital stock of $6,000 by Lewis E. Rote, William Fisher, and Martin Frobst.

ILLMO, Mo.—The Kelso Telephone Company has been incorporated with a capital stock of $5,000 by the following: L. J. Dennenmueller, Amos L. Drury, D. C. McLeese and others.

MINNEOLA, Kans.—The Minneola Indian Telephone Company has been chartered with a capital stock of $2,000 to do business in Clark, Meade, Ford, Kiowa, and Comanche counties.

NOBLE, Okla.—The South Canadian Telephone Company, with principal place of business at Noble, has been incorporated with a capital stock of $1,000. The directors are as follows: C. F. Wantland, C. M. Hobaugh, E. L. Sheets, Isaac Graham and A. Filtner, all of Noble.

DIKE, Ia.—The Lincoln-Beaver Telephone Company has been organized with the following officers: President, Jurgen Burns; secretary, John Webber; treasurer, Albert T. Jepkes.

CALDWELL, O.—Articles of incorporation have been filed for the Farmers' Telephone Company of Caldwell, with a capital stock of $10,000. W. E. Keith and others are interested in it.

CHICAGO, Ill.—The Elm Grove Telephone Company of Rose Township has been incorporated with a capital stock of $2,450 by Lewis T. Lipkey, Michael N. Reinhart, Michael Rueh.

COLOMA, Wis.—The Coloma Telephone Company has been incorporated with a capital stock of $3,000. The incorporators are F. W. Plotz, J. N. Spalding, W. F. Gray, James A. Shorey.

HASKINS, O.—The Haskins Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are H. A. Twining, L. A. Challen, H. J. Johnston, F. W. Heald.

TOBINSPORT, Ind.—The Tobinsport Telephone Company has filed articles of incorporation with a capital stock of $1,000. The directors are David White, John C. Esarey and Clarence Adams.

ALINE, Okla.—The Carwile Telephone Company has been incorporated with a capital stock of $600 by Nathan H. Ross, Fred J. Drolte, of Aline; Chas. F. Gardiner, of Ringwood.

FORT LAWN, S. C.—A charter has been granted to the Fort Lawn Telephone Company. Capitalization, $5,000. W. L. Abernathy, president; J. A. Garrison, secretary and treasurer.

INDIANAPOLIS, Ind.—The Stotts Creek Telephone Company of Johnson county has been incorporated with a capital stock of $3,000 by George T. Shuck, Robert W. Parkhurst and B. F. Cole.

ST. BERNARD, Neb.—The St. Bernard Telephone Company has filed articles of incorporation with the secretary of state. Capital stock, $500. Michael Hamer and others are incorporators.

BUSHTON, Ill.—The Seven Hickory and Morgan Township Mutual Telephone Company has been incorporated with a capital stock of $3,500 by H. Z. Chair, H. Brown and E. H. James.

TORONTO, S. D.—The Toronto Rural Telephone Company has been incorporated with a capital stock of $5,000 by S. A. Emerson, K. Britgard, Peter Budahl, Knute Oliverson, all of Toronto.

MT. HOOD, Ore.—The Mount Hood Telephone Company has filed articles of incorporation with a capital stock of $3,000. The incorporators are W. S. Gribble, C. M. Wishart and I. U. Lafferty.

FAIRVIEW, Ill.—The Fairview Southwestern Telephone Company has been incorporated with a capital stock of $1,000. The incorporators are Jerome Lawson, Thomas H. Travers, J. E. Barlow.

WASHINGTON, O.—The Washington-Brady Telephone Company has been organized with officers as follows: President, H. M. McCracken; secretary, C. W. Stockdale; treasurer, J. J. Griffith.

ALLEGANY, N. Y.—The Citizens' Telephone Company has been incorporated with a capital stock of $10,000 by Charles L. McGovern, Clair S. McGovern and O. J. Lewis, all of Allegany, and others.

CASCADE SPRINGS, S. D.—J. G. Neith and Fred Noerenberg of this place have organized a telephone company to build a line from Hot Springs to Cascade Springs, and out into Hot Creek county.

MARATHON, N. Y.—The Lapeer Telephone Company of Lapeer, N. Y., has been incorporated with a capital stock of $2,000, by L. C. Parker, E. E. Hults, and W. B. Lusk, all of Marathon, and others.

HOMEVILLE, W. Va.—The Homeville Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are B. B. Birdson, president; M. H. West, secretary and treasurer.

LYONS, O.—Articles of incorporation have been filed for the Lyons Mutual Telephone Company by Frank Denson, D. S. Knight, Eugene Carpenter, Charles W. Cassall, B. E. Pater and John Crow.

NEW MARTINSVILLE, W. Va.—The Enterprise Telephone Company has been incorporated with a capital stock of $50,000 by C. A. Lowther, Lina Lowther, C. F. Lowther, Anna L. Fitch and W. R. Fitch.

RIPLEY, Okla.—The Cimarron Valley Telephone Company has been chartered with a capital stock of $5,000 by W. E. Baker, T. A. Gordon, W. W. Van Pelt, W. H. Bowdlear, J. E. Oldham, and H. E. Peog.

BANDERA, Tex.—The Bandera Telephone Company has been incorporated with a capital stock of $4,000 by A. M. Stigler, W. O. Elkins, J. O. Butler, T. R. Caffall, G. Hicks, F. Hicks, and John F. Bandy.

WHITE LAKE, S. D.—Articles of incorporation have been filed for the Northwestern Telephone Company with a capital stock of $3,000. The incorporators are J. L. G. Sale, J. E. Ellis and Charles Gobler.

ALLIANCE, O.—The Telephone Signal Company has been incorporated by Ford C. Shreeve, Morris Taylor, William H. Shreeve, Orlin B. Shreeve and Arthur J. Shreeve, with a capital stock of $15,000.

FISHER'S SWITCH, Ind.—The Highland Telephone Company has

been incorporated with a capital stock of $2,000. The directors of the company are Claude Beaver, W. Beaver, C. Sachs and Thomas McCarty.

FLEMINGTON, Pa.—The Flemington Telephone Company has been incorporated with a capital stock of $5,000 by W. F. Gates, W. E. Tombin, J. A. Spencer, W. A. Curry, W. A. Williamson, J. W. Davidson.

RICHMOND, Okla.—The Farmers' & Merchants' Telephone Company has been incorporated with a capital stock of $10,000 by John W. White and U. R. White of Seiling, and William Goodhue of Richmond.

CANOVA, S. D.—Articles of incorporation have been filed by the Vermillion County Telephone Company with a capital stock of $500. The incorporators are W. T. Gough, C. W. Harter, Nels Graknberg and others.

COLUMBUS, O.—The North Jackson Telephone Company has been incorporated with a capital stock of $10,000. The incorporators are F. A. Eckis, N. W. Hole, S. H. Goldner, S. J. Clemens, Frank Buchwalter.

VANCE, Va.—A company has been organized with J. E. Giles, president; J. H. Collie, secretary; W. R. Davis, treasurer. It is the purpose of the company to construct a telephone line from Vance to Danville.

LINCOLN, Neb.—Articles of incorporation have been filed with the secretary of state by the Farmers' Telephone Company, with a capital stock of $7,000. The company will operate in Wayne and Thurston counties.

EDMOND, Okla.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $5,000. The incorporators are E. W. Wood, J. F. Paul, John McMullen, William Beresford, E. W. Childers.

ENDICOTT, Wash.—The Endicott Telephone Company has been incorporated with a capital stock of $6,000 to build telephone lines in Whitman county. The incorporators are Frank Hamilton, Ned Irwin and others.

WILLOW POINT, N. Y.—The Willow Point Telephone Company has been incorporated with a capital stock of $500 by Frederick A. Pierce, Charles M. Golden and William H. Murphy, all of Willow Point, and others.

LILY, S. D.—Articles of incorporation have been filed for the York-Troy Telephone Company, with a capital stock of $1,750. The incorporators are R. P. Korgard, M. A. Hanson, A. Knoble, A. S. Beeny and others.

LOVELL, Me.—The Independent Telephone and Telegraph Company of Lovell has been incorporated with a capital stock of $5,000. The officers are: President, C. P. Hubbard; treasurer, O. E. Andrews of Lovell.

BROOK, Ind.—The Newton and Jasper County Telephone Company has been incorporated with a capital stock of $7,500. An exchange will be established in Brook with lines throughout Newton and Jasper counties.

JET, Okla.—The Pleasant Valley Telephone Company has been incorporated with a capital stock of $12,000. The incorporators are H. O. Reeves, W. S. Heckenberry, W. L. Blacklodge, W. W. White, Calvin Jones, all of Jet.

EDMOND, Kans.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $5,000. The directors are as follows: E. W. Wood, J. P. Paul, John McMullen, E. W. Childers, all of Edmond.

EAST HANOVER, Pa.—An Independent telephone company has been organized at this place with the following officers: President, A. S. Rank; secretary, J. R. Mader; assistant secretary, S. N. Ulrich; treasurer, Samuel Fry.

CHARLOTTESVILLE, Ind.—The Charlottesville Northern Telephone Company has been incorporated with a capital stock of $160. The directors are Robert S. N. Oldham, C. W. Ramsey, W. R. Johnston, C. E. Ramsey, J. W. Addison.

TRUMANSBURG, N. Y.—The Trumansburg Independent Telephone Company has been organized and the officers are: President, Walter McKeel; vice-president, Frank Miller; secretary, Frank Carman; treasurer, I. McKeel.

BALLWIN, Mo.—The Ballwin Mutual Telephone Company has been incorporated with a capital stock of $2,000. The directors of the company are A. A. Weber, Henry Heinemann, Tim Munsch, Edward Blinne, C. L. Shotwell.

WALTON, N. Y.—The Walton Home Telephone Company has been incorporated with a capital stock of $25,000. The incorporators are George O. Mead, Walton; Matthew C. Lewis and Ralph J. Andrews, Hamden, and others.

ADAIRVILLE, Ky.—A new corporation, to be known as the Red River Telephone Company, has been organized by T. H. Baird, J. D. Ryan and W. R. Smith, and proposes to operate under the franchise recently sold to W. K. Smith.

TAOS, N. M.—The Taos Valley Telephone Company has been incorporated with a capital stock of $5,000. The incorporators and directors of the company are Peter M. Dolon, Jose Mountaner, Jno. A. Dorney, Juan A. Vigil, and others.

IONA, Ont.—The Southwold and Dunwich Telephone Association has been formed at this place with the following officers: President, W. R. Pollard; vice-president, R. Silcox; directors, the above officers and A. Turner and J. Orchard.

MODEL, Tenn.—The Model Telephone Company has been incorporated, with a capital stock of $5,000. The incorporators are: L. G. Acree, president; R. L. Blane, secretary and treasurer; W. N. Cherry, P. J. Spiceland, K. H. Dilday.

PENN, N. D.—The Penn Rural Telephone Company has been incorporated with a capital stock of $7,000. The incorporators are, Geo. Durgman, Nick Muehler, G. H. Gessner, Anthon House, John Johnson, J. H. Gessner, Frank C. Kalding.

MAYFIELD, Ky.—The Clarks River Telephone Company has filed articles of incorporation with a capital stock of $3,000. The incorporators are J. W. Davis, W. R. Allen, R. Y. Wilkerson. The principal place of business will be West Plains.

TRUMAN, Minn.—The Armstrong Telephone Exchange Company has been incorporated with a capital stock of $100,000, with officers as follows: President, W. L. Hoover; vice-president, John Robinson; secretary and treasurer, R. O. Armstrong.

BRANDON, S. D.—Articles of incorporation have been filed for the Corson Northwestern Telephone Company with a capital stock of $1,500. The incorporators are John Carlson, N. Hackensen, Andrew Gusarsen, Jonas Anderson, all of Brandon.

LAWTON, Okla.—The Canadian Farmers' Telephone Company has been organized with a capital stock of $50,000 and a charter will be applied for. It is the intention to construct telephone lines to all the towns of the county, with headquarters at El Reno.

BOLCKOW, Mo.—The Independent Telephone Line has been organized at this place by the following: W. E. Estes, Willis Schildknecht, I. Smith, Ben Smith, Charles Smith, Ezra Smith, Tom Scott, J. W. L. Miller, Charles Demoss and Peter Hope.

HARRIS GROVE, Ky.—Representatives of a number of Independent telephone companies recently met at this place and effected the consolidation of the several companies to be known as the Obion Telephone Company, with Dr. A. V. McRee president.

FT. ATKINSON, Ia.—The Farmers' Mutual Telephone Company has been incorporated with a capital stock of $2,500. The officers of the company are as follows: President, C. D. Horton; vice president, L. T. Huber; secretary and treasurer. J. A. Huber.

INDIANAPOLIS, Ind.—The Peru Common Battery Lockout Telephone Company has been incorporated with a capital stock of $7,000 by Mark P. Boone, E. H. Griswold, Joseph Andres, John E. Yarling, Joseph M. Bergman, Jerome Herff and Louis H. Fulwiler.

VALMEYER, Ill.—A telephone company has been organized at this place with Henry Volhardt as president and Dr. E. J. Lee, Jr., secretary. The lines of the company will connect Valmeyer with those of the Farmers' Fountain Telephone Company of New Hanover.

ENID, Okla.—The Skelton Rural Telephone Company has been incorporated with a capital stock of $450, by the following: H. A. Thompson, J. J. Field, J. H. Gibson, A. E. Roever, of North Enid; H. E. Whitney, F. M. Barnhisel and H. P. Carter, of Enid.

FT. KENT, Me.—The St. Francis Telephone Company has been incorporated with a capital stock of $5,000. The officers of the company are: President, J. J. Wheelock, St. John, Me.; treasurer, F. W. Mallett, Fort Kent; clerk, Howard Pierce, Fort Kent.

CARIBOU, Me.—The name of the White Mountain Telephone Company has been changed to the Aroostock Telephone and Telegraph Company, the par value of shares has been reduced from $100 to $10 and the capital stock increased from $100,000 to $250,000.

COAL GROVE, O.—The Coal Grove Telephone Company has been organized with the following officers: President, J. K. Brammer; vice president, Dr. M. E. Remy; secretary, C. W. Shaffer; treasurer, John D. Thatcher; trustees, Newton Hill, C. L. Steed and John C. Melvin.

PIERZ, Minn.—A telephone company will be organized by Andrew Theon of Ramey and Frank Mischke of Buckman to build a telephone line from Buckman to Royalton and from Buckman to Pierz, thence to Lastrop, Sullivan and Vineland. An exchange will be installed at Pierz.

NEW PARIS, O.—The New Paris Home Telephone Company has filed articles of incorporation. Capital stock, $40,000. Incorporators, S. C. Richie, P. C. Dowler, A. C. Lindemuth, L. D. Lesh, W. D. Rush. This company is incorporated to take over the local telephone system at this place.

TOLEDO, O.—The Erie Construction Company has been incorporated with a capital stock of $10,000 by James E. Brailey, of the Toledo Home Telephone Company, H. P. Yeager, A. F. Hanson, W. E. Cordill and John C. Newton. The purpose of the organization is to construct telephone lines.

LOUISVILLE, Ky.—The General Telephone Company has been

organized to take over the Louisville Independent long-distance and all smaller companies in Owensboro, Lexington, Marysville, Paris, Eminence and all sections near these points in Kentucky. Southern Indiana will also be included.

LEONARD, Mich.—Articles of incorporation have been filed with the county clerk by the Leonard Telephone Company, with a capital stock of $2,500, of which $1,200 has already been paid in. G. B. Dewey and William G. Poole of Oxford and George E. Snyder of Ovid are the principal stockholders.

MAJORSVILLE, W. Va.—Farmers in the vicinity of Dallas and Majorsville have organized the Home Telephone Company for the purpose of constructing a telephone system. The officers are: President, David Archer; vice-president, Samuel Fisher; secretary, Samuel Carter; treasurer, John Sampson.

VANTOWN, Mich.—The Citizens' Mutual Telephone Company of Ingham county has been incorporated with a capital stock of $6,000. The officers are as follows: President, Lewis Austin; secretary, Charles Brownell; directors, N. A. Wilcox, Elmer Benjamin, James Rincunan, Elmer Kirkland; E. A. Greening.

WALLED LAKE, Mich.—The Walled Lake Telephone Company has filed articles of incorporation with a capital stock of $1,000. The incorporators are George Dickerson, Eugene Cahoon, I. S. Carnes, H. F. Andrews, S. M. Gage, F. A. Parmeter, C. H. Hosner, the three latter constituting the board of directors.

ALDERTON, Wash.—A company to be known as the Farmers' Telephone Company has been formed for the purpose of putting in a telephone line between Puyallup and Orting. The officers, who are residents of this place, are as follows: President, John Alton; vice-president, Walter Durgin; secretary, Max Wassmund.

PARSONS, Kans.—The Prairie Telephone Company has secured a New Jersey charter, permitting it to construct and operate telephone lines outside of the state. The capital stock is $200,000 and the incorporators are James A. Plotner and C. B. M. Chase, both of Kansas City, and Fred H. Brown of Parsons, Kans.

EXETER, N. H.—Mr. George B. Shaw has disposed of his interest in the Exeter Telephone Company and has incorporated a company under the laws of Maine, which will be known as the Exeter Construction Company and will have for its purpose general construction work, making a specialty of constructing telephone lines.

EXLINE, Ia.—The Caldwell Mutual Telephone Company, with headquarters at Exline, has been incorporated with a capital stock of $1,000. The officers of the company are as follows: President, F. M. Tull, Exline; vice-president, William Traxler, Exline; secretary, John Leonard, Cincinnati, Ia.; treasurer, Euras Johnson, Exline.

NORWAY, Me.—The Crockett Ridge & Millettville Telephone & Telegraph Company has been organized with a capital stock of $5,000 for the purpose of constructing, maintaining and operating telephone or telegraph lines in certain portions of Oxford county. The officers are: President, E. B. Tubbs, Norway; treasurer, H. G. Dinsmore, Norway.

MAQUON, Ill.—Articles of incorporation have been issued by the secretary of state for the Maquon Northeastern Farmers' Telephone Company, with a capital stock of $1,600. The incorporators of the company are F. J. Walker, F. E. Nelson and F. J. Housh. The directors are F. E. Nelson, Elva Woolsey, F. J. Housh, Charles Sherman and A. S. Potter.

HOT SPRINGS, S. D.—Articles of incorporation have been filed for the Sheep Canyon Telephone Company at Hot Springs, with a capital stock of $5,000. The purpose of the company is to build a line from Hot Springs to Oelrichs. The officers of the company are: President, W. F. Wyatt; vice-president, F. M. McClelland; secretary-treasurer, C. E. McClelland.

SPARTANBURG, S. C.—The Spartanburg Cross Arm, Pin and Bracket Company has been organized with a capital stock of $10,000 to manufacture cross arms, pins and brackets for electric light, telephone and telegraph construction work. Mr. D. L. Wray is promoting the enterprise and he has interested a number of successful business men of the city.

DUTTON, Ont.—The Dunwich and Dutton Telephone Association has been formed to construct telephone lines from Dutton to various points, construction work to begin at an early date. The officers of the company are as follows: President, W. A. Galbraith; vice-president, Dr. W. T. Hamilton; secretary-treasurer, W. H. Barnum; trustees, J. B. Crawford, J. H. McIntyre.

JOHNS, Ala.—A telephone company has been organized at this place with the following officers: President, David Howton; secretary and treasurer, Jeff Cowan; trustees, J. K. P. Laird, Joseph Sachs. Considerable amount of stock has already been pand in. It is the intention of the company to construct a telephone line from Oak Grove to Johns and Adger, and from these points to Bessemer, where it will connect with the People's Home Telephone Company.

CHICKASHA, I. T.—The Washita Valley Telephone Company has been chartered with a capital stock of $10,000, of which $1,200 is paid in. The officers are: President, John Ireton; vice-president, G. W. Brooks; secretary-treasurer, C. J. Taylor; general manager, W. G. Brumer. It is the purpose of the company to build a line from Chickasha to Lindsay.

WILLIAMS, Ia.—Articles of incorporation have been filed for the Mutual Telephone Company of Williams, with a capital stock of $15,000. The officers of the company are: President, E. R. Johnson; vice-president, J. L. Wilds; secretary, Roy P. Johnson; treasurer, William Gerber; general manager, A. W. Ross; directors, J. L. Wilde, E. I. Johnson, J. P. Talcott, A. W. Ross, W. H. Rick.

SAUK CENTER, Minn.—A rural telephone company has been organized, to be known as the Sauk Valley Rural Telephone Company, and will at once begin the work of constructing a line. The officers are as follows: President, Fred Hultgren; vice president And. Rasmussen; treasurer, Otto Warner; directors, N. P. Anderson, J. F. Coyle, C. G. Edman, P. Tronus, A. P. Anderson, Paul Pirschel.

LOUDON, Tenn.—The People's Telephone Exchange has filed application for a charter, with a capital stock of $10,000. The organization has been formed for the purpose of combining the various private telephone lines extending to all parts of the county. It is the intention of the company to extend its lines. The incorporators are W. E. Huff, R. B. Robinson, A. W. Ward, R. M. Johnston, C. P. Taliaferro.

EXETER, N. H.—Following the sale of the local Independent telephone system a new company has been organized to be known as the People's Telephone Company of New Hampshire. The incorporators are Warren Brown of Hampton Falls, Warren M. Batchelder of Hampton, George A. Carlisle and Augustus Young of Exeter and Daniel J. Bakie of Kingston. This company will construct a line in Exeter and surrounding towns, and franchises have already been secured in Exeter, Kensington, East Kingston, Kingston and Hampton Falls.

STASER, Ind.—Incorporation papers have been issued by the secretary of state to the Barton & Staser Telephone Company, with headquarters at Hornville, near Staser in this county, with a capital stock of $2,000. The incorporators are: Ira M. Barton, Otto Volkman, Leo Bosse, August Sell, Lizetta Heldt, Chas. Silke, J. A. McDowell, H. B. Barnes, W. E. Barnes, Fred Rhoderman, F. W. Korff, August Temme, Kate Richardt, Krist Keuester and Chas. Farney. The line will connect with other lines over the county and form a county service.

ELSMORE, Kans.—A stock company is being formed, which will have a capital stock of $10,000, to take over the property of the Katy Telephone Company in Allen county and establish a local exchange in Iola. As soon as the company is formed and the property of the Katy company taken over the new company will make application for a franchise in Iola. The company already has 187 telephones in service in the vicinity of Elsmore, with toll line to Humboldt and many telephones in the oil fields south of Humboldt. The officers of the company are: President, Carl Peterson; general manager, D. Braden, Elsmore.

MEADVILLE, Pa.—The Eastern Crawford Telephone Company has been organized, with a capital stock of $15,000, to operate in Crawford county. Lines will be built from Meadville to Blooming Valley, Guy's Mills, Townville, Centerville and Spartanburg. The officers of the company are: President, James R. Andrews; vice-president, W. J. Maddox; secretary, H. M. Dickerson; treasurer, C. S. Burwell; general manager, John H. Wright; directors, J. R. Andrews, C. S. Burwell, H. M. Dickson, of Meadville; John H. Wright and W. J. Maddox of Jamestown, N. Y.; D. C. Smith of Guy's Mills, W. H. Boss and George E. Marsh of Townville.

BUTTE, Mont.—The Montana Independent Telephone Company, with a capitalization of $2,000,000, has been formed and the city council has been asked for a franchise. Among those interested are: F. Augustus Heinze, Charles R. Leonard, Charles J. Kelly, D. F. Hennessy, H. A. Galloway, Henry Muhler, Herbert B. Brown, Elmer B. Jones, F. W. Moss. Elmer B. Jones, managing director of the Utah Independent Telephone Company, was the main promoter of the organization. The application for franchise states that it is the intention of the organizers to cover the state of Montana with a network of wires within the next year. H. B. Brown of the contracting department of the Utah Independent Telephone Company will be manager of the new concern.

UNDERGROUND CONSTRUCTION

MENDOTA, Ill.—The Northern Illinois Telephone Company has asked the council for permission to place its wires in conduits.

GENEVA, N. Y.—A resolution has been adopted by the board of public works ordering all telegraph, telephone and electric light wires off all streets where the conduit is laid, in thirty days, otherwise the city will remove them.

ELECTIONS AND MEETINGS

FREMONT, O.—The stockholders of the Home Telephone Company have elected the following directors: T. M. Brush and A. E. Baggerly, Edgar P. Brown.

IROQUOIS, Ill.—The Iroquois Telephone Company has elected officers as follows: President, Charles A. Calkins; secretary, Curtis Miller; treasurer, Sol Meyer.

NEVINVILLE, Ia.—The Nevinville Telephone Company has elected the following directors: R. N. Gregory, manager; Fred Johnson, Frank Spellman, P. M. Gregory.

COXSACKIE, N. Y.—The Coxsackie and Greenville Telephone Company at its annual meeting elected D. E. Davis, Harrie McK. Curtis and Henry Brownell directors.

WELLSBORO, Pa.—The Farmers' Mutual Telephone Company has elected the following officers: President, Francis Kelly; vice-president, J. F. Haverly; secretary, Fred H. Niles.

BAINBRIDGE, N. Y.—The Bainbridge Telephone Company has elected the following officers: President, W. H. Hastings; vice-president, B. G. Allen; secretary, A. A. Hoyt.

NORDNESS, Ia.—The Nordness Telephone Company has elected officers for the ensuing year as follows: President, O. O. Lomen; manager, J. Brown; auditor, O. J. Thorgrimson.

ALPHA, Ia.—The Alpha Telephone Company has elected the following officers: President, C. Carr; vice-president, J. T. Gage; secretary, E. W. Paul; treasurer, W. H. Stone.

GALWAY, N. Y.—The Galway Telephone Company has elected the following officers: President, M. McWilliam; vice-president, Walter I. Cavert; secretary and treasurer, F. L. Smith.

JESUP, Ia.—The Farmers' Telephone Company has elected the following officers: President, Dr. Haradon; vice-president, John Burrill; secretary, C. L. Bright; treasurer, Charles Brush.

URBANA, O.—The Urbana Telephone Company has elected the following officers: President, C. H. Marvin; vice-president, J. I. Blose; secretary, E. R. Cheney; treasurer, J. C. Powers.

BICKNELL, Ind.—The Bicknell Telephone Company has re-elected its old officers as follows: President, Joseph Barr; secretary, John Hoover; treasurer, Frank McClure; manager, W. D. Lemen.

PENN YAN, N. Y.—The Keuka Park Telephone Company has elected the following officers: President, James H. Pepper; vice-president, E. B. Knight; secretary and treasurer, Fred Culver.

PRINCETON, Ind.—The Independent Telephone Company has elected the following officers: President, R. N. Parrett; treasurer, J. W. Ewing; secretary, C. F. Stevens; manager, F. R. Parsons.

LITTLE MEADOWS, Pa.—The Little Meadows Telephone Company has elected the following officers: President, A. D. Brown; vice-president, F. A. Johnson; secretary and treasurer, W. D. Minkler.

CANESTOGA, Pa.—The Canestoga Telephone & Telegraph Company has elected the following officers: President, Henry Hertzler; treasurer, Stephen Mast; superintendent and manager, Jacob Heartz.

LIBERTYVILLE, Ia.—The Libertyville Telephone Company has elected officers as follows: President, R. O. Sherrick; vice-president, Emery Wilson; secretary, Dan Garber; treasurer, Frank Glotfelty.

WHITE OAK, Ia.—The White Oak Telephone Company has elected officers as follows: President, E. F. Varnholt; vice-president, George Miller; secretary, D. C. Bowers; treasurer, Amandus Lehr.

DONEGAL, Kans.—The Donegal Mutual Telephone Company has elected the following officers: President, R. Nessing; vice-president, H. J. Altman; secretary, L. L. Hoffman; treasurer, A. L. Buck.

HIRAM, O.—The Hiram Telephone Company has elected officers as follows: President, F. W. Hurd; vice-president, W. D. Dudley; secretary, W. N. White; treasurer, H. F. Rouse; manager, H. C. Hurd.

ROANOKE, Ind.—At a meeting of the Roanoke Telephone Company the following officers were elected: President, E. M. Wasmuth; secretary-treasurer, E. E. Richards; directors, S. H. Grim and E. F. Smith.

CONNEAUT, O.—The Conneaut Telephone Company has elected officers as follows: President, H. H. Hunt; vice-president, A. J Jacker; secretary and manager, M. Goebricher; treasurer, G. M. Brown.

HANLONTOWN, Ia.—The Hanlontown Co-operative Telephone Company has elected the following officers: President, L. M. Gesme; vice-president, N. N. Storre; secretary and treasurer, N. W. Phillips.

HUBBARD, Ia.—The Hubbard and Buckeye Telephone Company has elected officers as follows: President, O. G. Lewison; vice-president, Ed Brightwell; secretary, Herman Clute; treasurer, T. Whaley.

HOME, Kans.—The Home City Mutual Telephone Company has elected the following directors: C. A. Batterson, E. H. Tangeman, E. W. Zimmerling, C. Noller, W. B. McGrath, James Cooper, John Hartman.

DAMASCUS, O.—The Damascus Telephone Company has elected officers as follows: President, A. R. Cobbs; vice-president, J. S. Walker; secretary and general manager, L. F. Pearce; treasurer, G. A. Kinsey.

BORDEN, Ind.—Officers have been elected by the Farmers' Union Telephone Company as follows: President, J. G. Scott; vice-president, Walter Scott; secretary, Jefferson Johnson; treasurer, George L. McCutcheon.

PORT JERVIS, N. Y.—The Port Jervis Telephone Company has elected officers for the coming year as follows: President, Moses Depuy; vice-president, Dr. Cuddeback; secretary, A. Parshall; treasurer, E. F. Mapes.

SEYMOUR, Ind.—The Farmers' Union Telephone Company has elected officers for the coming year as follows: President, George Lewis; vice president, O. M. Coryell; secretary, F. W. Spell; treasurer, E. J. Hughes.

MOUNTAIN LAKE, Minn.—The North Star Telephone Company has elected the following officers: President, S. Balzar; vice-president, Frank Balzar; secretary and treasurer, J. H. Dickman; manager, T. Schroeder.

OAKFIELD, Wis.—The Oakfield Telephone Company has elected the following officers: President, A. J. Zielke; vice-president, George Day; secretary, W. E. Bristol; treasurer, C. H. Moore; superintendent, T. E. Worthing.

HART, Mich.—The Lake Shore Telephone Company has elected the following directors: G. T. Sands, C. L. Churchill, H. S. Newton, J. K. Flood, E. A. Fuller, A. E. Souter, George A. Hawley, L. W. Rose, L. P. Hyde.

MALCOM, Ia.—The Malcom Central Telephone Company has elected the following officers for the ensuing year: President, Wm. McClure; vice-president, Chas. Eisele; treasurer, C. O. Bowers; secretary, S. E. Royce.

FARLIN, Ia.—The Bristol Township Telephone Company has elected the following officers: President, D. J. Merriam; vice-president, J. R. Mathews; treasurer, Forez West; secretary, E. A. Cairns; director, W. J. Banning.

GRAND MOUND, Ia.—The Farmers' Mutual Telephone Company has elected officers as follows: President, A. A. Barber; vice-president, A. M. Miller; secretary, John Mients; treasurer, Will Crowley; trustee, Henry Weick.

SAGINAW, Mich.—The Northeastern Telephone Company has elected officers as follows: President, W. W. Jones of Toledo; vice-president, George E. Metzger, Toledo; secretary and treasurer, George E. Dutton, Saginaw.

MARIETTA, O.—The Marietta & Caldwell Telephone Company has elected the following officers: President, A. L. Gracey; vice-president, W. H. H. Jett; treasurer and general manager, Raply Wooster; secretary, A. C. Davis.

SALINA, Kans.—The Salina Telephone Company has elected the following officers: President, J. O. Wilson; vice-president, John Anderson; secretary, Clarence Wilson; treasurer, Fred H. Quincy; general manager, D. A. Van Trine.

HITCHCOCK, S. D.—The Pioneer Telephone Company, recently incorporated at this place, has elected the following officers: President, Chas. Phillips; vice president, W. D. Johnson; secretary, Chas. McFarland; treasurer, J. A. Payne.

EVANSVILLE, Wis.—The Evansville Telephone Company has elected the following officers: President, A. S. Baker; vice-president, A. C. Gray; secretary, R. M. Richmond; treasurer, George L. Pullen; superintendent, G. W. Leyda.

AMUND, Ia.—The Eden Mutual Telephone Company held its annual meeting and the following officers were elected: President, B. Lohn; vice president, O. J. Iverson; secretary, Ed Walle; treasurer, David Skuttle; director, O. K. True.

ADAMSVILLE, O.—At the annual meeting of the stockholders of the Adamsville Telephone Company the following directors were elected: C. H. Hanks, C. A. Geyer, B. H. Spicer, G. W. Williams, C. B. Bell, C. O. Hardy and E. C. Jordan.

NASHVILLE, Ill.—The Nashville Mutual Telephone Company has elected the following officers for the ensuing year: President, Jos. McDowell; vice-president, Fred Stark; secretary, Garfield Law; treasurer, Frank Meyer; trustee, Ben Meyer.

BEAUCE, Que.—The Beauce Telephone Company has elected the following officers: President, A. Pacaud; vice-president, H. Lacoursiere; directors, Senator Bolduc, P. F. Renault, P. Angers, J. Cloutier, J. Poirier, H. A. La Rue, J. A. Mailhoux.

CHICAGO, Ill.—At the annual meeting of the Strowger Automatic Telephone Company, the semi-annual dividend of 50 cents a share which has been paid since July, 1903, was declared and the directors and officers elected as follows: President, J. L. Kesner; vice-president, C. C. Wheeler; treasurer, F. Siegel; assistant treasurer, S. F. Harris; secretary, M. Sello; directors, Joseph Harris, Adolph

Nathan, J. L. Kesner, F. Siegel, M. Sello, S. F. Harris, A. E. Wilson, A. D. Nast, C. C. Wheeler.

MORRISTOWN, Minn.—The Morristown Telephone Company has elected the following officers for the ensuing year: President, K. C. Knauss; vice-president, W. F. Sweetser; second vice-president, L. A. Kisor; secretary, L. J. Eisert; treasurer, S. R. Miller.

CLINTON, N. Y.—The board of directors of the Clinton Telephone Company have elected the following officers: President, G. J. Caldwell; vice-president, George R. Fuller; treasurer, Charles H. Poole; secretary, G. A. Jackson; engineer, D. A. Cline.

BURGESSVILLE, Ont.—The Burgessville Telephone Company has elected the following officers: President, H. E. Seruis, Burgessville; vice-president, J. G. Carless, Burgessville; secretary-treasurer, H. Sneath, Woodstock; managing director, Martin Emigh.

OREGON, Ill.—The Tri-County Telephone Association has elected the following officers: President, M. Kennedy; vice-president, Will Somers; treasurer, E. C. Oakland; secretary, T. Joce. The condition of the association was found to be very satisfactory.

BRIDGEPORT, O.—The directors of the Belmont Telephone Company have elected the following officers: President, Hon. J. C. Heinlein; vice-president, Henry Schmulbach; secretary, W. I. Steer; treasurer, J. C. Dent; general manager, A. H. Doudna.

REESEVILLE, Wis.—The Dodge County Telephone Company at a recent meeting re-elected the following officers for the ensuing year: President, Christian Reinhard; vice-president, Charles Ladwig; secretary, E. A. Reese; treasurer, William Dauffenbach.

BLOOMINGTON, Ill.—At the meeting of the Illinois Independent Telephone Association recently held in this city the following officers were elected: President, Manford Savage of Champaign; vice-president, B. F. Wasson of Clinton; treasurer, T. L. Parks of Leroy.

MT. HOREB, Wis.—The Mt. Horeb Telephone Company held its annual meeting at this place and elected the following officers: President, N. C. Evans; vice president, Thos. Ayen; secretary, J. H. Dahlen; treasurer, T. G. Lingard; general manager, J. N. Dahlen.

STENDAL, Ind.—The stockholders of the Stendal Telephone Company held their annual meeting and elected the following officers: President, Abner McAllister; vice president, Frank Jones; directors, Charles Katter, Fred Smacker, George Ingram, and Ora Ferguson.

CLEVELAND, O.—At the annual meeting of the stockholders of the United States Telephone Company the following directors were elected: H. A. Everett, E. W. Moore, C. W. Wason, B. Mahler, E. S. Dickson, J. B. Hoge, Calvary Morris, H. R. Newcomb, C. Y. McVey.

LANGFORD, S. D.—At a meeting of the stockholders of the Langford Telephone Company by-laws were adopted and the organization of the company perfected by the election of the following officers: President, John Anderson; secretary, J. H. Richards; treasurer, A. J. Miles.

IOWA CITY, Ia.—The Johnson County Telephone Company has elected the following officers: President, A. T. Averil; vice-president, S. W. Mercer; secretary and treasurer, Jay Chatham; directors, A. T. Averil, G. M. Averil, H. A. McDonald, Jay Chatham, S. W. Mercer.

TONICA, Ill.—At the annual meeting of the Tonica Switchboard Company the following officers were elected: President, J. R. Lambert; vice-president, J. F. Ebner; secretary and treasurer, C. R. Ong. The net earnings for the past year were nearly 12 per cent of the receipts.

BLUE SPRINGS, Neb.—The stockholders of the Blue Springs Telephone Company held their annual meeting at this place and elected the following officers: President, A. R. Morris; secretary-treasurer, A. H. Krauss. The reports showed the company to be in first-class financial condition.

EVANSVILLE, Ind.—The Independent Telephone Company, recently incorporated, has elected the following officers: President, A. F. Karges; vice-president, A. P. Lahr; secretary and treasurer, Jas. V. Rush; second vice-president, George Torion; general manager, A. J. Rosseau.

HITCHCOCK, S. D.—The Pioneer Telephone Company, recently incorporated at this place with a capital stock of $5,000, has completed its organization by electing the following officers: President, Chas. Phillips; vice president, W. D. Johnson; secretary, Charles McFarland; treasurer, J. A. Payne.

PRIMGHAR, Ia.—The Primghar and Gaza Mutual Telephone Company at its annual meeting elected the following officers for the coming year: President, J. H. Irvine; vice president, F. A. Schierholz; treasurer, T. Idso; secretary, J. Q. Chapman; directors, Fred Rembe, J. E. Ralston, R. W. Johnson.

ANDERSON, Ind.—At the annual meeting of the stockholders of the Delaware & Madison Counties Telephone Company the following officers were elected: President, G. W. Beers, Ft. Wayne; vice-president, W. H. H. Quick, Ft. Wayne; secretary, T. F. Rose, Muncie; treasurer, W. E. Hitchcock, Muncie.

JEFFERSON, Ia.—At the annual meeting of the Citizens' Mutual Telephone Company the following directors were elected: M. L. Steele, G. A. Wiggins, J. H. Alberts, W. S. Stevens, W. A. McDonald, Sr., J. E. Stewart, H. Harding, G. W. Munn, Ed Monthel, F. M. Brown; secretary, James A. Henderson.

MORAVIA, Ia.—At a meeting of the promoters of a mutual telephone system for Moravia a permanent organization was effected by electing officers as follows: President, J. E. Callen; vice-president, Sam Boyer; secretary, W. O. Hiatt; treasurer, N. McCloud. A committee was appointed to draft articles of incorporation.

MANKATO, Minn.—The stockholders of the Mankato Citizens' Telephone Company have elected the following directors for the term of three years: W. D. Willard, Dr. J. H. James, H. A. Patterson, John R. Thomas. Reports showed that the company now has $111,000 invested in its plant and 1,100 subscribers in the city.

LOUISVILLE, Ky.—At the annual meeting of the Independent Long Distance Telephone Company the following directors were elected: John A. Armstrong, J. D. Powers, Chas. J. Doherty, Donald McDonald, S. S. Adams, Jr., C. C. Bickel, J. W. Irwin, E. M. Coleman, C. L. Hughes, George W. Lewman, C. D. Knoefel, Matt O'Doherty, Ed L. Barber.

LOUISVILLE, Ky.—At the annual meeting of the stockholders of the Louisville Home Telephone Company the following directors were elected: John A. Armstrong, Charles J. Doherty; E. M. Coleman, C. C. Bickel, J. D. Powers, George W. Lewman, C. L. Hughes, W. C. Garland, J. G. Gray, C. D. Knoefel, Donald McDonald, Matt O'Doherty, Ed L. Barber.

SHERBURN, Minn.—The Jay Telephone Company recently held its first annual meeting. Reports showed the company to be in first-class condition financially. The following officers were elected: President, F. E. Davis; vice-president, Louie Becker; secretary and treasurer, Bert Ellis; directors, Thos. Madsen, Frank Eisenminger, M. W. Mayo and Frank Anderson.

FARNHAMVILLE, Ia.—The Farmers' Mutual Telephone Company at its annual meeting declared a dividend, and plans for improving and enlarging the service were considered. The following officers were elected: President, H. W. Beachman; vice-president, J. L. Summers; treasurer, Chas. Beachman; secretary, J. C. Crissinger; directors, A. Coon and Wm. Andrews.

WHITE LAKE, S. D.—The Northwestern Telephone Company recently incorporated at this place has elected the following officers: President, J. H. Dunbar; vice-president, John Schlaeder; secretary, M. E. Williams; treasurer, Fred Steffen. Material for the new line will be purchased at once so that it may be on the ground by the time the weather will permit construction work.

MULBERRY, Ind.—The stockholders of the People's Co-operative Telephone Company recently held their annual meeting and the following officers were elected for the coming year: President, Allen Troxell; secretary, George H. Miller; treasurer, James N. Sims. The company has more than 400 telephones in service and a number of names on its waiting list.

BURLINGTON, Ia.—At a meeting of the Southeastern Iowa Telephone Association the following officers were elected: President, E. E. England of Mt. Pleasant; vice-presidents, F. Purchase of Burlington, O. H. Seifert of Eddyville, C. A. Farrington of Centerville, J. S. Bellamy of Knoxville, L. D. Robinson of Winfield; secretary and treasurer, W. H. Fowler, Pella.

MARSEILLES, Ill.—At a meeting of the stockholders of the Marseilles Telephone Company the transfer of stock was made and a new board of directors elected as follows: F. T. Neff, A. C. Allen, Marseilles; N. C. Richardson and E. H. Moulton, Jr., Minneapolis. Under the management of the newly organized company a number of changes are anticipated. Officers will be elected later.

HALSTAD, Minn.—The Halstad Telephone Company at a recent meeting elected officers as follows: President, Charles Madsen; vice-president, A. Aanenson; secretary, A. O. Serum; treasurer, K. O. Slette; directors, M. T. Rasmussen and the above officers. Reports showed the company to be in a prosperous condition. The company will construct additional lines during the summer.

BENZONIA, Mich.—The Benzie County Telephone Company recently held its annual meeting. The old officers were re-elected with the exception that W. L. Case of Benzonia and John T. White of Kaleva were elected directors to succeed O. E. Putney and E. Juergenmeyer. The stockholders were well pleased with the condition of affairs and prospects for the coming year are all that could be hoped for.

COLUMBUS, O.—The Columbus Citizens' Telephone Company has elected the following officers for the ensuing year: President, Henry A. Lannam; vice-president, John Joyce; secretary-treasurer, Frank A. Davis; general manager, Gansey R. Johnson; directors, Henry A. Lanman, John Joyce, Edwin R. Sharp, Frank A. Davis, J. B. Hanna, L. D. Haggerty, C. C. Griswold, H. M. Daugherty and Frank Beam.

FT. WAYNE, Ind.—At a meeting of the stockholders of the National Telephone & Telegraph Company the following directors were elected: H. C. Paul, C. S. Bash, W. L. Moellering, W. A. Bohn, S. S. Fisher, A. E. C. Becker, G. Max Hofmann, James M. McKay, E. M. Popp; president, H. C. Paul; vice-president, C. S.

Bash; treasurer, W. A. Bohn; secretary and general manager, W. L. Moellering.

HAMILTON, O.—The Hamilton Home Telephone Company has re-elected its old officers as follows: President, Frank Hughes; vice-president, C. E. Griesmer; secretary, J. W. Sloneker; treasurer, F. W. Whitaker; manager, W. Gilbert Thompson; directors, Sam D. Fitton, Frank Hughes, J. C. Slayback, C. E. Griesmer, O. M. Bake, F. M. Barden, J. W. Sloneker, W. Gilbert Thompson, and F. W. Whitaker.

PARKERSBURG, W. Va.—At the close of the session of the West Virginia Independent Telephone Association, recently held in this city, officers were elected as follows: President, W. C. Handlan, Wheeling; vice-presidents, J. H. Wise, Cameron; W. M. Clayton, Parsons; J. W. Downs, Buckhannon; Hugh Amos, Burnsville; Lon H. Hutchinson, Huntington; secretary, A. C. Davis; Parkersburg; treasurer, Lloyd Beeghley.

UNIONTOWN, Wash.—The new trustees of the Uniontown Telephone Company have elected the following officers: President, Lambert Taufen; vice-preisdent, Dr. W. W. Miller; secretary and manager, Paul Fuchs; treasurer, L. F. Darr. The company is in a prosperous condition and plans are being made to extend the line to Johnson in the spring, where connections will be made with Pullman, Colfax and other towns.

BALTIMORE, Md.—At the annual meeting of the Maryland Telephone Company and the Baltimore Electric Power Company, the directors were re-elected as follows: David E. Evans, George R. Webb, B. S. Josselyn, Bernard H. Baker, Frank A. Furst, Reuben Foster, Frank H. Calloway, John Waters, and John Hubner, all of Baltimore; and Sidney L. Wright, W. Frederick Snyder and Hugh H. Harrison of Philadelphia.

SAVANNAH, N. Y.—The Savannah Telephone Company has elected the following officers for the ensuing year: President, Edson S. Wood; vice-president, Edgar P. Brown; secretary and treasurer, Crossman A. Coleman; directors, Wm. Pasco, Edson S. Wood, Crossman A. Coleman, Charles A. Mead, Fred Hadden, H. Owen Lord, Elyria; A. W. Overmeyer, Lindsey; and S. Brinkerhoff, J. M. Sherman, E. M. Russell and James Hunt of Fremont.

SAN DIEGO, Cal.—The Televue Company, which has been incorporated with a capital stock of $1,000,000, has organized by the election of the following officers: President, C. F. Willard; vice-president, C. L. Warfield; secretary, W. H. Holcombe; treasurer, Philip Stein; general manager, J. R. Fowler. The company is now ready to begin the manufacture of its devices, which are telephones through which the parties at either end may see each other.

IOWA FALLS, Ia.—At the annual meeting of the Central Iowa Telephone Company the following directors were elected by the stockholders: William Mayse, W. D. Wagoner, Joseph Husman and J. H. Hunemann of La Porte; W. V. Shipley and J. H. Funk of Iowa Falls; George Wright, Charles Hawkole, of Eagle Grove, and Otto Wettsetin of La Porte. The board elected the following officers: President, W. D. Wagoner; vice-president, J. H. Funk; secretary and treasurer, W. V. Shipley.

LEBANON, Pa.—At the meeting of the stockholders of the Cumberland Valley Telephone Company the following directors were elected: B. F. Meyers, John Hoffer, Jr., and Frank E. Zeigler, Harrisburg; Edward Davis and S. R. Caldwell, Philadelphia; Col. C. M. Clement, Sunbury; S. P. Light, Lebanon; T. J. O'Neil, C. J. DeLone, Hanover. The directors organized by electing the following officers: President, B. F. Meyers; vice-president, Edward Davis; treasurer, S. R. Caldwell; secretary, Frank E. Zeigler.

POMONA, Cal.—The stockholders of the Pomona Valley Telephone & Telegraph Company recently held their annual meeting and elected the following directors for the coming year: Dr. F. W. Thomas, J. Albert Dole, D. S. Parker, Charles E. Walker, G. W. Ogle, L. A. Lorbeer and Arthur M. Dole. The annual reports of the secretary showed a remarkable growth in the business of the company and extension of the company's lines, with an increasing patronage. The company has 1,350 subscribers.

LITTLE ROCK, Ark.—The Telephone Company of Arkansas, which was organized by the Independent Telephone Association, for the purpose of constructing toll lines in the state, has elected the following officers: President, W. D. Hearn, Pine Bluff; vice-president, L. Minor, Newport; secretary, Charles F. Speed, Texarkana; treasurer, W. B. Worthen, Little Rock; directors, J. S. Warren, Memphis; Mack Hammett, Pine Bluff; W. M. Rickett, Little Rock; J. B. King, Texarkana; W. Arthur Latham, Port Smith.

PITTSBURG, Pa.—The Pittsburg and Allegheny Telephone Company has elected officers as follows for the coming year: President, J. G. Splane; vice-president, John S. Weller; treasurer, R. C. Hall; secretary, T. G. Davis; directors, J. G. Splane, John S. Weller, Robert C. Hall, David P. Reighard, J. M. Clapp, R. H. Binns, H. B. Beatty, George R. Webb, Ralph E. Flinn. Reports showed a substantial increase in the number of telephones during the year. The board appropriated $750,000 to carry forward new construction work and extensions during the current year.

SANBORN, Minn.—The telephone company recently formed at this place has completed its organization by electing the following officers: President and manager, H. J. Fink; vice president, Emil Gerth; secretary, F. W. Stevens; treasurer, G. A. Dreblow; directors, H. J. Fink, Emil Gerth, F. W. Stevens, Chas. Goehring, G. A. Dreblow, H. K. Schroeder, Henry Schwerdtfeger. A committee has been appointed to draft a constitution and by-laws and to secure a charter for the company, which will be known as the New Sanborn Telephone Company. Construction work will begin as soon as the weather will permit.

ELMIRA, N. Y.—At the annual meeting of the New York State Telephone Company the following officers were elected: President, Edward Davis, Philadelphia; vice-president, Boyd McDowell, Elmira; secretary, Eugene Divan, Elmira; treasurer, E. M. Yarnell, Philadelphia; directors, Frederick W. Swan, M. H. Murphy, Eugene Divan, Boyd McDowell, Myer Friendly, H. C. Mandeville, H. N. Gett, S. L. Johns, Hon. W. U. P. Thompson, E. G. S. Reinhold, Colonel C. M. Clement, Edward Davis, E. M. Yarnell, T. B. Crary, William Fell, E. B. McKee, Charles L. Tracy, A. B. Greenshield, Hon. Ellis L. Orvis, E. M. Leader.

ORDINANCES AND FRANCHISES

ANAMOOSE, N. D.—W. E. Glotzbach is seeking a franchise for a local exchange.

HOWARD, Kans.—O. B. Walker has been granted a telephone franchise in Howard.

ECHO, Oreg.—The Butter Creek Telephone Company has applied for a franchise at Echo.

FLORA, Ill.—The city council has granted a franchise to the People's Telephone Company.

GRANBURY, Tex.—The Hood County Telephone Company has been granted a franchise in Granbury.

WARREN, Ind.—Columbus Harrold has asked for a fifty year telephone franchise in the town of Warren.

NAPA, Cal.—R. L. Grigsny of Napa has been granted a franchise to operate a telephone system in Hot Springs.

ROCKFORD, Wash.—The Rockford and Mt. Hope Telephone Company has applied for a franchise at Rockford.

PEOLI, O.—The Peoli and Gilmore Telephone Company has been granted a franchise to install a telephone system.

MIDDLETOWN, O.—The Home Telephone Company of Hamilton will make application for a franchise in Middletown.

EVANSVILLE, Ind.—The Citizens' Telephone Company, recently incorporated in this city, has applied for a franchise.

LAWTON, Okla.—W. P. Records, F. A. Miller, and F. M. English are seeking a franchise for a telephone system in Lawton.

CLYDE, Wash.—Messrs. Eilert and Bradburg have been granted a franchise to construct a telephone line from Clyde to Lamar.

TEXARKANA, Ark.—The Texarkana Telephone Company has been granted an exclusive franchise on the Texas side of the city.

HAMMONDSPORT, N. Y.—The Hammondsport Telephone Company has been granted a fifty year franchise by the village trustees.

LAKE BUTLER, Fla.—The city council has granted a twenty-year franchise to S. H. Mallory to operate a telephone exchange in Lake Butler.

EVANSVILLE, Ind.—A third telephone franchise has been filed with the board of public works, by Clifford Arrick, an attorney from Indianapolis.

LATAH, Wash.—The Stringtown and Latah Telephone Company has made application for a franchise to construct telephone lines in the vicinity of Latah.

BUTTE, Mont.—F. H. Stow, representing the Home Telephone and Telegraph Company of Portland, has applied for a telephone franchise in this city.

MILLSTADT, Ill.—The Farmers' Mutual Telephone Company has applied for a franchise to install an exchange at Millstadt, connecting with its party lines.

GREAT FALLS, Mont.—Frank H. Stow, representing the Home Telephone & Telegraph Company of Portland, has applied for a franchise at Great Falls.

RUSSELLVILLE, Ky.—The Home Telephone Company of Bowling Green has secured a franchise in Russellville and will at once begin the installation of a telephone plant.

CASTLEDALE, Utah.—R. C. Miller of Castledale has been granted an exclusive franchise to construct and operate telegraph and telephone lines in the county of Emery.

COLUSA, Cal.—Dr. W. T. Rathbun of this place has applied to the board of supervisors of this county for a franchise to operate a telephone system in this city and county.

MT. CALM, Tex.—The City Council has granted the Mt. Calm Telephone Company and E. F. King of Mart, franchises for telephone systems, work to begin within 90 days.

DUNCAN, I. T.—The Chickasaw Telephone Company has been

granted a franchise to construct and operate an exchange at Cornish, I. T., midway between Duncan and Ardmore.

NEW ORLEANS, La.—C. T. Stark of St. Louis, Mo., representing a syndicate of St. Louis capitalists, has applied for a fifty year franchise to install an underground telephone system.

WEATHERSBY, Miss.—The board of aldermen has granted a franchise to Ware & McInnis to erect a telephone system here. The firm already has a line from Mendehall to Weathersby.

CHENEY, Wash.—A petition for a telephone franchise has been presented to the county commissioners by F. H. Harris, Joe Calvert, W. D. Garper, Thomas Rogers, David Calvert, and others.

LETHBRIDGE, Alberta.—A. J. Arnold, of Windsor, has applied for a charter for a railway company, with power to operate a long distance telephone line from Lethbridge to Edmonton by way of Calgary and High River.

BRANTFORD, Ont.—Brantford has granted a twenty-one year franchise to the Canada Automatic Machine Telephone Company. The company must start service within one year, and the city can buy out the company any time after three years.

SPOKANE, Wash.—The State Line Telephone Company, the Spokane Bridge and Liberty Lake Rural Telephone Company and the Valley Prairie Telephone Association have applied to the board of county commissioners for franchises to construct telephone lines.

PRINCETON, Ind.—Charles E. Stevens of the Princeton Independent Telephone Company has been granted a franchise to erect and maintain an exchange in Oakland City. The company will pay 1 per cent of its gross earnings to the city at the expiration of ten years.

GREENFIELD, Mass.—At a meeting of the board of selectmen it was voted to grant a franchise to the Heath Telephone Company to enter the city. The company has also secured a franchise for a line to Whatley, and it is the purpose of the company to eventually have a line through to Northampton. The company's main office is at Shelburne.

LOS ANGELES, Cal.—William J. G. Lambert, local manager of the Home Telephone Company has been advised from San Francisco that the franchise giving the Home company an entrance into San Francisco has been granted. Mr. Lambert states that the company will immediately begin the installation of its system at a cost of $10,000,000. Long distance connections will be made as soon as the plant can be installed.

OTWAY, O.—The Otway village council has granted a franchise to the Farmers' Union Telephone Company to extend its line into the village. The company operates an Independent line from Otway to Mt. Unger and now enters this place over the Home Telephone Company's wires. The company contemplates a line to Friendship and thence to Portsmouth, which extension will probably be made during the present season.

NEW CONSTRUCTION

ATLANTA, Ga.—The Atlanta Telephone Company will build a new exhange.

LEBANON, O.—The Valley Telephone Company will install a complete new exchange.

MT. VERNON, Ia.—The local telephone company is planning to rebuild its system throughout.

MADISON, Mo.—The Mutual Telephone Company is preparing to build an exchange in this city.

PETERSON, Minn.—The citizens of Peterson are making arrangements to install a local telephone exchange.

ARROW ROCK, Mo.—The Arrow Rock Telephone Company contemplates the construction of additional lines.

HEMET, Cal.—The Southwestern Home Telephone Company of Redlands will establish an exchange in Hemet.

ARLINGTON, Ind.—The Arlington Telephone Company has ordered plans for the erection of a new telephone exchange.

COLUMBIA, Wash.—The Citizens' Telephone Company, recently incorporated, will spend $50,000 in construction work.

FALL RIVER MILLS, Cal.—The Local Telephone Company recently incorporated at this place will construct a line to Bartle.

ARTESIA, N. M.—The Artesia Telephone Company is having plans prepared for the erection of an exchange building.

OSCEOLA, Wis.—The Osceola Farmers' Mutual Telephone Company is considering the construction of a telephone line to Milltown.

PEKIN, Ill.—The Citizens' Telephone Company has just installed 1,600 feet of cable at Manito and will put in a copper circuit to Havana.

MEDICINE HAT, Assiniboia.—A rural telephone system is to be constructed at Medicine Hat and through the Cypress Hills ranching country.

CAMBRIDGE, O.—The Odell, Sugartree and Northeastern Telephone Company will build a toll line from Cambridge to Odell in the near future to accommodate companies that are forming that desire connection with the county seat.

ELIZABETHTOWN, Ky.—The Hardin County Telephone Company contemplates building a number of new lines and making many improvements.

HAVANA, Cuba.—The Cuban Telephone and Telegraph Company will erect a new exchange building. Charles J. Close, contractor of Columbus, O., has the work in charge.

ARLINGTON, O.—A telephone system will be installed in this place by the Mutual Telephone Company, recently organized for that purpose. P. J. Baker is president of the company.

YOUNGSTOWN, O.—The Youngstown Telephone Company contemplates putting in another line from Hubbard to Youngstown and other new lines connecting nearby towns and country lines.

CHENEY, Wash.—The Lakeview Telephone Company, an organization of farmers in the vicinity of Cheney, has made application to the county commissioners for the privilege to construct a telephone line.

QUINCY, Wash.—W. H. Babcock, president of the Babcock-Kaufman Cattle Company, will install a local telephone system in Quincy this spring, provided enough subscribers can be secured to justify it.

ATLANTA, Ga.—The Atlanta Telephone and Telegraph Company will install a telephone system which will include East Point, Decatur, Kirkwood, Clarkston, Ingleside, Scottdale and several other nearby towns.

HOWARD, S. D.—W. G. Brokelhoupt, representing the Dakota Central Telephone Company, has closed a deal for a local telephone system in Howard. Rural lines will be extended and the local service greatly improved.

ST. PETER, Minn.—The Nicollett County Telephone Company is preparing for a busy year. A great many petitions for county lines have been placed on file and it is evident that the operations of the field department are to be very extensive.

WEBSTER CITY, Ia.—The Martin Telephone Company is building several new toll lines and is making preparations to install new exchanges at Stanhope and Stratford. Two new lines are under construction to Waterloo and others are being built into Blairsburg, Williams, Kamrar and Jewell.

WINCHESTER, Va.—Applications have been received by the Frederick county board of supervisors from the Opequon Telephone Company of Frederick and Shenandoah counties and from the Bloom Telephone Company of Frederick county for the privilege of constructing and maintaining telephone systems within the county

INDIAN CREEK, Tex.—The Indian Creek Telephone Company which was recently organized will soon begin the construction of a telephone line which will touch the principal points in San Baba county and will cover a good portion of the southern part of Brown county. The officers of the company are: President, W. H. Hooper; secretary-treasurer, G. A. Line; directors, W. G. Grady, G. T. Chambers and L. J. Honea.

EXTENSIONS AND IMPROVEMENTS

RIFLE, Colo.—The Rifle Creek Telephone Company will extend its line.

HAVRE, Mont.—The Havre-Box Elder Telephone Company will make extensions.

ELK HORN, Ia.—The Marne and Elkhorn Telephone Company will extend its lines.

BEDFORD, Ia.—The Bedford Telephone Company will make many improvements in its system.

MARIETTA, O.—The Marietta Telephone Company will spend $50,000 in improving its system.

BOWLING GREEN, Ky.—The Home Telephone Company will install an exchange at Russellville.

OWENSVILLE, Ind.—The Independent Telephone Company of this place will install a new switchboard.

NEW MARION, Ind.—The New Marion and Holton Telephone Company will build additional lines.

NEWTON FALLS, O.—The Newton Falls Telephone Company contemplates further extensions of its system.

NORTH LIBERTY, Ia.—The North Liberty Telephone Company will make a number of improvements and extensions.

WEST LEBANON, Ind.—The directors of the West Lebanon Telephone Company have decided to improve and extend the system.

SEDRO-WOOLEY, Wash.—The Skagit Valley Telephone Company will soon make an extension of its lines from Burlington to this city.

OSCEOLA, Wis.—The Osceola Farmers' Mutual Telephone Company has under consideration the construction of a telephone line to Milltown.

MONROVIA, Cal.—The Monrovia branch of the Home Telephone

Company has decided to spend $10,000 on its system at this place. Among the improvements will be included the placing of 12,000 feet of cable.

HUGHESVILLE, Mo.—In order to meet the demands for service it will be necessary for the Hughesville Telephone Company to increase its facilities.

WASECA, Minn.—The Waseca Telephone Company expects to make extensive improvements and extensions to its system during the coming season.

WADESBORO, N. C.—In addition to installing new office equipment the Wadesboro Telephone Company will make many other improvements in its system.

LORAIN, O.—At the annual meeting of the Black River Telephone Company held recently it was decided to extend the lines to the east, west and south of the city.

SPRING GROVE, Ill.—The Spring Grove Telephone Company, which was recently incorporated with a capital stock of $10,000, is planning many extensions of its system.

HURDLE MILLS, N. C.—The North Carolina Telephone Company is putting in a metallic line from Rougemont to Durham, and will soon install a switchboard at Rougemont.

KOKOMO, Ind.—The Citizens' Telephone Company will make improvements, install some new apparatus and long distance booths and extend the lines and better the service in general.

SAND POINT, Idaho.—Arrangements have been made to build a telephone line from Sand Point to Hope. The Spokane International railway will construct a line from Sand Point to Bonner's Ferry.

RIVERSIDE, Cal.—Improvements to the amount of $30,000 are planned for the local system of the Home Telephone Company, which will include new switchboard and a five-mile, 200-strand cable.

GASTONIA, N. C.—The Piedmont Telephone Company will build an exchange at Grover and will rebuild its exchanges at Blacksburg and Yorkville. Several toll lines will also be built giving service to a number of counties.

ATTICA, Ind.—The Attica Telephone Company will greatly improve its present system. A number of new rural lines will be constructed and the new line recently completed to Riverside will be extended to Independence.

GREEN BAY, Wis.—At its annual meeting, held in this city, the Fox River Valley Telephone Company decided to build additional toll lines during the coming season. It was also decided to increase the capacity of the Appleton exchange.

PULLMAN, Wash.—The Ewartsville Telephone Company will make extensions. This telephone system, which is now on a paying basis, had its beginning in a telephone line composed of wire fences connecting three farmers' homes with Pullman.

TIPTON, Ind.—The Sandbank Telephone Company of Tipton has purchased all the poles of the Tipton Telephone Company east of the city and will stretch wires as far as Hobbs, where it will establish a station. H. C. Hackett is president of the company.

FINANCIAL NOTES

STAR, Ill.—The Star Telephone Company has increased its capital stock to $25,000.

NEVADA, Ia.—The Mutual Telephone Company has declared a 2½ per cent dividend.

LORAIN, O.—The Black River Telephone Company has declared a 6 per cent dividend.

ULLIN, Ill.—The Ullin Telephone Company has increased its capital stock from $2,500 to $5,000.

CLEARWATER, Minn.—The Clearwater Telephone Company has declared a 10 per cent dividend.

WAYNE, N. Y.—The Wayne-Monroe Telephone Company has declared a dividend of 1½ per cent.

EATON, O.—The Eaton Telephone Company has increased its capital stock from $60,000 to $100,000.

SHELBY, O.—The Shelby Telephone Company has increased its capital stock from $60,000 to $75,000.

WILLOW, Okla.—The Willow Telephone Company has increased its capital stock from $1,000 to $10,000.

HOMER, Mich.—The Homer Telephone Company has increased its capital stock from $15,000 to $30,000.

COVINGTON, O.—The Yorkshire Telephone Company has increased its capital stock from $10,000 to $20,000.

PLATTSMOUTH, Neb.—The Plattsmouth Telephone Company has declared an annual dividend of 10 per cent.

RICHMOND, Mass.—The Richmond Co-operative Telephone Company has increased its capital stock to $3,000.

HANSKA, Minn.—At the annual meeting of the Hanska Rural Telephone Company a dividend of ten per cent was declared and directors elected as follows: Casper Olstad, Christ Ahlness and F. G. Chambard.

WINDSOR, Ill.—The Windsor Mutual Telephone Company has increased its capital stock from $2,500 to $5,000.

COXSACKIE, N. Y.—The Coxsackie and Greenville Telephone Company has declared a ten per cent dividend.

GASTONIA, N. C.—The Piedmont Telephone & Telegraph Company will increase its capital stock to $200,000.

MAJENICA, Ind.—The Majenica Telephone Company has increased its capital stock from $10,000 to $25,000.

DENISON, Tex.—The North Texas Telephone Company has increased its capital stock from $15,000 to $30,000.

ST. LOUIS, Mo.—The Ewing-Markle Electric Company has increased its capital stock from $50,000 to $150,000.

ADENA, O.—The Adena Exchange Telephone Company has increased its capital stock from $20,000 to $100,000.

SAGINAW, Mich.—The Northeastern Telephone Company of Saginaw has declared a semi-annual dividend of 2½ per cent.

CHICAGO, Ill.—The Monarch Telephone Manufacturing Company has increased its capital stock from $1,000 to $100,000.

NEW HOLLAND, Pa.—At a meeting of the Enterprise Telephone Company it was decided to increase the capital stock from $25,000 to $50,000.

CHICAGO, Ill.—The Nordstrom Lockout Telephone and Manufacturing Company has increased its capital stock from $10,000 to $24,000.

CARBONDALE, Ill.—A certificate has been filed by the Farmers' League and Community Telephone Company increasing its capital stock from $2,500 to $5,000.

TERRE HAUTE, Ind.—A mortgage for $1,000,000 has been filed by the Citizens' Telephone Company to cover a loan with which extensive improvements are to be made.

MOUNTAIN LAKE, Minn.—The North Star Telephone Company has paid an annual dividend of 10 per cent to its stockholders. The company has enjoyed a very prosperous year.

BEAUCE, Que.—At its annual meeting the Beauce Telephone Company declared a dividend of 8 per cent and placed $1,000 to reserve fund as the result of its operations for 1905.

ROCKLAND, Me.—The name of the Eastern Telephone Company has been changed to the Maine Telegraph and Telephone Company and the capital stock has been increased to $250,000.

GLENWOOD, Wis.—The West Wisconsin Telephone Company has filed an amendment increasing its capital stock from $7,000 to $15,000. W. H. Park is president and P. A. Beebe secretary.

REDLANDS, Cal.—Papers showing an increase in the capital stock of the Redlands Southwestern Home Telephone Company from $50,000 to $100,000, have been filed with the county recorder at San Bernardino.

TOLEDO, O.—The Talk-o-Phone Company, which recently reduced its capital stock to $261,000 has filed certificate of increase to one million dollars. The purpose of the increase is to greatly enlarge the scope and operations of the company.

MANSON, Ind.—The People's Co-operative Telephone Company has filed amended articles of incorporation, also notice of increase of capital stock. The company will reconstruct its system. J. A. Curtis, A. W. Carter and T. D. Chaney are directors.

MINNEAPOLIS, Minn.—The Twin City Telephone Company's report to the state auditor shows the gross earnings for the year ending November 30, 1905, were $506,210.62, upon which the company paid a gross earnings tax of 3 per cent amounting to $15,186.31.

BENTON, Ky.—The Marshall County Telephone Company has increased its capital stock from $5,000 to $50,000. The company has also declared a dividend of 10 per cent. Connections will soon be made with Hopkinsville and other long-distance lines are under course of construction.

CLEVELAND, O.—The annual financial statement of the United States Telephone Company shows a little above 2 per cent earned on the common stock for the past year. During the past year the company has spent an increased amount for extension of business, which cut down its earnings.

SPRINGFIELD, Minn.—The Farmers' and Citizens' Mutual Telephone Company has declared a dividend of 20 per cent. Had the company not made so many improvements in the way of extension of new lines the dividends would have been between 30 and 33 per cent. All the old officers were re-elected.

APPLETON, Wis.—The Fox River Valley Telephone Company has filed its first annual report, which shows 1,100 local telephones in service, with 1,300 miles of wire. The gross receipts of the local exchange were $19,677.85, of which the company is compelled to pay 2½ per cent to the city and state for taxes.

PARKERSBURG, W. Va.—The annual report of the West Virginia Western Telephone Company shows the earnings for the past year

to be $45,988.77, against $38,538.90 in the previous year. The expenses were $31,382.75, against $26,944.16 in the preceding year, and the profits were $14,606, against $11,594.74 the previous year.

COLUMBUS, O.—Reports for the year show a great increase in earnings for the Columbus Citizens' Telephone Company. Interest on bonds and dividends on preferred and common stock were earned and in addition a good amount was passed to the surplus account of the company. Several improvements are being planned for the coming year.

INDIANAPOLIS, Ind.—The Indianapolis Telephone Company has made its semi-annual payment, which amounts to $6,354. The company reports that it has 9,354 telephones in service. Under its contract the company must pay $6,000 a year and $2.00 for each connection over 6,000. On this basis the city receives $12,708 a year from the company.

COLUMBUS, O.—At the meeting of the stockholders of the Columbus Citizens' Telephone Company announcement was made that the company had leased the Franklin County Telephone Company. The basis of the lease is a guarantee of 5 per cent annual dividends on the $150,000 of the Franklin company. The Franklin company has fourteen exchanges in Franklin county and operates over 2,000 telephones.

LIMA, O.—The earnings of the Lima Telephone & Telegraph Company have been sufficient the past year to pay the regular dividends of the preferred stock and four per cent on common stock, leaving a surplus of $5,000. The company has outstanding $150,000 common stock, $100,000 six per cent cumulative preferred stock and $128,000 five per cent bonds. The property was purchased from the Federal Telephone Company by a syndicate about a year ago.

HART, Mich.—The stockholders of the Lake Shore Telephone Company have authorized the directors to float a bond issue to take care of the company's outstanding debts and to provide for renewals and expansions. The secretary's report shows property amounting to $109,156. The by-laws were changed so as to allow a board of nine directors with authority to fill vacancies on the board and to elect president, vice-president, secretary and treasurer from their number.

HOUSTON, Tex.—The South Texas Telephone Company of Austin, Tex., has filed with the county clerk a mortgage deed of trust securing $150,000 5 per cent gold bonds, dated November 1, 1905, due November 1, 1925, the property mortgaged being all rights, franchises, land, buildings, furniture, fixtures, telephone equipment in offices, machinery, instruments, poles, wires, cable, conduits, booths, tools, material, rights of way and all other property (real, personal and incomes), rents and profits now owned and held and enjoyed or hereafter to be constructed, acquired, owned, held and enjoyed by this company, to secure the payment of the principal and interest of said bonds.

OWENSBORO, Ky.—The Rural Telephone Company has filed articles of incorporation with the county clerk, increasing its capital stock from $25,000 to $50,000. The increase was authorized by a meeting of the stockholders some time ago. The object is to provide increased capital stock for the extension of the connections of the company with especial reference to long-distance business. The company now connects the Owensboro system with that of the Indiana companies and other connections will be established. H. K. Cole is president of the company and Newman Birk secretary and manager. Two-fifths of the entire capital stock is to be preferred on the books of the company as to participation in dividends and the remainder common stock.

LOUISVILLE, Ky.—A mortgage for $5,000,000 has been recorded in the office of the county clerk, by which the Central Home Telephone Company, a Delaware corporation, executes a lien on all its Kentucky lines and charters to the Columbia Finance and Trust Company, issuing gold mortgage bonds to that amount bearing 5 per cent interest. The company has its chief office in Wilmington, Del., and its chief Kentucky office in Louisville. The mortgage is executed to raise money for extending the service and bearing corporate expenses. This is a holding company organized to control Independent lines throughout Kentucky and Indiana, and operates in harmony with the Home company. It has taken over many small exchanges and is extending the lines and connecting exchanges so as to perfect a system of communication between every point in the territory covered.

PERSONAL MENTION

WINLOCK, Wash.—C. E. Burber will install a telephone system.

SILVER LAKE, Minn.—R. R. Livingstone is circulating a petition to establish a telephone line.

ARENZVILLE, Ill.—J. A. Way has been appointed manager of the Arenzville Telephone Company.

MOUNDS, I. T.—C. M. Schlichter has purchased the property of the Mounds Telephone Company.

ROCHESTER, N. Y.—John C. Woodbury has been elected president of the Stromberg-Carlson Telephone Manufacturing Company, succeeding Alfred Stromberg.

PORT AU PRINCE, Hayti.—Lekio Borno has assumed the management of the telephone service of the island.

SCALP LEVEL, Pa.—J. T. Chilcott has taken charge of the Salix Telephone Company's system at this place.

SENTINEL BUTTE, N. D.—A. L. Martin has organized a telephone company to construct a line from this place to Yule.

FORT ATKINSON, Wis.—James L. Christie has been appointed manager of the Jefferson County Telephone Company.

MELROSE, Minn.—W. Balder, formerly of Albert Lea, has been appointed manager of the Melrose Telephone Company.

LE CLAIRE, Ia.—James J. Ryan has been elected president of the Independent Telephone Company to succeed B. F. Coe, resigned.

JACKSON, O.—Sidney Gilbert, manager of the Jackson County Home Telephone Company, has resigned his position with the company.

BELLEVUE, O.—Mr. L. C. Rosenkrans has been appointed manager of the Bellevue Home Telephone Company and has entered upon his duties.

GREEN BAY, Wis.—Frank Carswell has been appointed general manager of the Fox River Valley Telephone Company. The company now has a total of 2,000 telephones in service.

WADENA, Minn.—C. R. Messenger, manager of the local telephone company, has resigned his position and will become district manager for the Dakota Central Telephone Company at Aberdeen, S. D.

PARIS, Ill.—H. B. Newman has been awarded the contract for the erection of a $10,000 building in this city for the Wabash Valley Telephone Company. A new switchboard will be installed in the new building.

MIDDLEBURG, Pa.—J. P. Ruhl, manager of the Buffalo Valley Telephone Company, of Lewisburg, was in this city recently in conference with business men and capitalists in regard to organizing a local telephone company in Snyder county.

ROCHESTER, N. Y.—J. William Lattig, who recently incorporated the Automatic Telephone Company, is working on a device which he claims will enable telephone users to see each other while talking over the wire, and feels confident of success.

MINNEAPOLIS, Minn.—Charles H. Coar has resigned his position with the Northern Telephone Company to accept a position with the engineering department of the Twin City Telephone Company. Mr. Coar was recently appointed a member of the Minnesota State Board of Electrical Examiners by Governor Johnson.

DETROIT, Mich.—W. C. Polk of Birmingham, Ala., engineer, will have charge of the construction of the plant which is to be built in this city by the Home Telephone Company. The work will be done by a specially organized construction company known as the Electrical Construction Company of St. Louis, which is capitalized at $125,000, all paid in.

SPENCER, Ia.—B. H. Chase, manager for the Citizens' Telephone Company, has resigned his position and has been succeeded by Arthur L. Ritchie of Mason City. Mr. Chase has accepted a position with the Western Electric Telephone System as promoter for new lines and exchanges and securing connecting lines with farmers' companies, with headquarters at Spencer.

LEGAL ITEMS

BEATRICE, Neb.—Joseph R. Dodds has secured a writ of injunction against the New Home Telephone Company and its promoters, to restrain them from proceeding with the work of installing a plant at Wymore.

BALTIMORE, Md.—The Court of Appeals has reversed the decision delivered by Judge Harlan last July that the Maryland Telephone Company had no right to raise its telephone rates under the existing ordinance. The decision allows the company to make any rate with its subscribers it should desire.

HOUSTON, Tex.—Judge Norman G. Kittrell has appointed W. C. Emmer of Beaumont receiver for the Phoenix Telegraph & Telephone Company, which owns and operates a telephone line along the Texas and Pacific Railroad between Honey Grove and Sherman, and which also operates exchanges at Honey Grove and Bonham.

TRENTON, N. J.—Oscar Keen of Newark has been appointed receiver for the Interstate Telephone Company. Charges of extravagance in the management of the company have brought about this result. Mr. Carroll Robbins, trustee under the mortgage, has taken possession and is operating the property, and the business of the company will be carried on as heretofore. The company has no outstanding debts uncared for, the net profits of its business are increasing, the general business of the company is growing and the outlook is promising.

TRANSFERS

SANBORN, N. D.—D. F. Siegfried has sold the telephone exchange to Earl Shannon.

GRANTVILLE, Kans.—Wm. Massey has purchased the Independent telephone system at this place.

LA GRANDE, Ore.—The Vergere Telephone Company has purchased the Cove telephone line.

ST. STEPHENS, S. C.—M. A. Floyd has purchased the Berkley Telephone System at this place.

TROY, Ind.—The Troy Telephone Company has been purchased by Christopher Busse of this place.

WOODWARD, Okla.—W. A. Martin has purchased the telephone interests of E. S. Wiggins at Woodward.

BEDFORD, Ia.—All the toll lines extending out from Bedford have been purchased by the Bedford Telephone Company.

BELLAIRE, Mich.—The Traverse Bays Telephone Company has bought the rights of the Swaverly Telephone Company at Bellaire.

DEER CREEK, Ind.—The Deer Creek telephone system, owned by J. M. Davis, has been purchased by W. A. Miller and Lester Ramsey.

TABOR, Ia.—The stock of the Tabor City Telephone Company has been purchased by I. W. Waynick of Leavenworth, Kans. The system has about 1,000 telephones in service.

ATLANTA, Ind.—The telephone exchange at this place owned by Warren Goodykoontz, has been sold to the Farmers' Telephone Company east of Atlanta for a consideration of $2,500.

VIOLA, Wis.—The Union Telephone Exchange at this place has been purchased by the La Crosse Interurban Telephone Company, which will rebuild the exchange and put in a complete new system.

ATLANTA, Ga.—The Fairview Telephone Company, owning and operating telephone lines in Hamilton and Tipton counties, has purchased the rights and property of the Atlanta company in those places.

CHARLESTON, Ill.—The Kinloch Telephone Company of St. Louis is negotiating for the purchase of the Charleston Telephone Company. The local company is owned by F. A. Brooks and R. Cadle and is valued at $40,000.

DALHART, Tex.—C. S. Morris has purchased the telephone exchange at this place. He has greatly improved the same and is building toll lines to surrounding towns. An exchange will soon be installed at Channing.

LINCOLN, Neb.—Peter Mortenson and F. H. Wheeler of Lincoln have purchased the Ord, North Loup and Burwell telephone exchanges and lines formerly owned by Bell & Sorenson. The new owners will inaugurate many improvements.

BETHANY, Ill.—E. W. Herman has sold the telephone exchange in this place to George B. Spitler of Mt. Zion. Mr. Spitler owns the exchanges at Mt. Zion, Dalton City and Lake City. The plant will be rebuilt and put in first-class condition.

SARATOGA, Ind.—The Eastern Indiana Telephone Company, recently incorporated at Winchester, has completed a deal by which it comes into possession of the telephone exchange at Saratoga, with 100 telephones in service and toll lines to Ft. Recovery, O.

SANDUSKY, O.—A deal has been consummated whereby a Toledo syndicate headed by J. S. Brailey, Jr., has acquired a controlling interest in the Sandusky Telephone Company. The company still remains a distinct local concern, none of the stockholders having disposed of his entire holdings. The company now has about 1,400 telephones in service.

IOWA CITY, Ia.—A deal has been consummated whereby A. T. Averil and G. M. Averil of Cedar Rapids have purchased $23,000 of the $46,000 of stock of the Johnson County Telephone Company. The Wisconsin stockholders, Messrs. Tainter, North and Goss, all retire. Cedar Rapids capitalists and local and West Liberty people now control the company solely.

BURLINGTON, Kans.—J. C. Woollomes has sold the Burlington Telephone Exchange, with all its equipment, to a company from Sabetha, who will take immediate possession of same. The purchasers are practical and experienced telephone men, who recently disposed of their exchanges in the northern part of the state. There is said to be ample means behind the enterprise and that it is the intention to push the business.

ESTHERVILLE, Ia.—The Western Electric Telephone Company has sold its exchange in this place to a Mr. Gardner of Osage, Ia., for $10,000. The exchange consists of over 500 telephones and is in excellent condition. The Emmett County Telephone Company also has a franchise, but has never constructed its system. Now that the Western Electric Company has disposed of its interest the Emmett County company may begin the construction of its exchange.

ATLANTA, Ind.—The Fairview Telephone Company, owning and operating telephone lines running through the eastern part of Hamilton county, has purchased the Atlanta Telephone Company, owned by Warren Goodykuntz. The Fairview company is composed of a number of wealthy farmers and has a complete rural exchange connecting nearly every farm house for miles east and west of Atlanta. The consideration was $2,500. The main office will now be at Atlanta.

MIDDLEBURY, Vt.—A recently formed corporation called the Champlain Valley Telephone Company, with headquarters at Middlebury, has purchased the plants of the New England Telephone and Telegraph Company in Middlebury, Brandon, and Vergennes; also the entire property of the Addison County Telephone Company and the Kelley telephone lines in Salisbury. It is the intention of the new company to consolidate these various lines and extend and improve the system as rapidly as possible. William H. Davis of Middlebury is manager of the new corporation.

DU QUOIN, Ill.—The Du Quoin, Anna, Marion and Carbondale telephone companies have been taken over by the Ohio and Mississippi Telephone Company of Carbondale, which was formed, with a capital stock of $100,000, for the purpose of taking over and operating these companies. The new company has elected officers as follows: President, Edward Sampson, Anna; vice-president, H. C. Miller, Du Quoin; secretary, F. W. Willard, Anna; treasurer, D. M. Parkinson, Carbondale; general manager, E. J. Baldridge, Du Quoin; directors, H. C. Miller, M. C. Brooking, Joab Goodall, J. M. Mitchell, J. B. Bundy, D. M. Parkinson, Edward Sampson, A. J. Phillips.

REORGANIZATIONS

WASHINGTON, O.—The Institute Telephone Company has been reorganized.

FLAT ROCK, Ind.—The Flat Rock Telephone Company will be reorganized and it will continue to operate as an Independent company. The new officers are: President, John Gant; secretary-treasurer, Thomas Wooley.

MISCELLANEOUS

ROCK GROVE, Ill.—The Rock Grove Farmers' Telephone Company will be incorporated.

KIOWA, I. T.—The W. Cason Telephone Company has installed a new exchange at Kiowa.

LEAVENWORTH, Kans.—The People's Telephone Company will thoroughly overhaul its plant.

JOHNSTOWN, Pa.—An effort is being made to organize a farmers' telephone company in this vicinity.

GIFFORD, Idaho.—An extensive system of farmers' telephones is being installed in the vicinity of Gifford.

LAMBERT, Tex.—I. J. Boyd is building farmers' lines and will install a small switchboard in the near future.

DU BOISE, Neb.—The Du Boise Telephone Company at its annual meeting reduced its rates to $1 per month.

AUDUBON, Minn.—A telephone company is being organized to establish a telephone system in Audubon and vicinity.

INDIANAPOLIS, Ind.—The Indiana Independent Telephone Association will hold its annual meeting in this city May 17.

ASSARIA, Kans.—Negotiations are pending for the sale of the Assaria Telephone Company's line to the Salina Telephone Company.

MILES CITY, Mont.—Kenneth McLean and H. Gilmore are organizing a telephone company to build a line from Miles City to Shirley.

PRINCETON, Ind.—The city council has served notice on the Independent Telephone Company to remove its wires and poles from the streets within sixty days.

POMEROY, Wash.—The Automatic Telephone Company is asking the city council for a charter to install its system in this city, the franchise to run 35 years.

SYRACUSE, N. Y.—The Independent Telephone Company has about completed its new exchange and will transfer from its old to its new headquarters within a few days.

BLOOMFIELD, Ind.—An Independent telephone company has been established at Owensburg and arrangements are being made to connect with the Home Telephone Company at this place.

MILLERSBURG, O.—The property of the Marshallville and Rittman Telephone Company has been transferred to its new owners, the Millersburg, Wooster and Orville Telephone Company.

CARTHAGE, Ind.—As the result of a canvass made by R. S. Hamilton of Morristown, the rental list of the Independent Telephone Company has been increased from 790 to 1,005 in sixty days.

VANCOUVER, B. C.—Mr. Robert Kelley of this city is one of the promotors who is seeking to incorporate the Conrad Telephone Company to operate a telephone system at Dawson, in the Yukon territory.

KILBOURNE, Ill.—J. H. Sullivan, manager of the Pekin Telephone

Company, was in this city recently in the interest of the above company, which is considering the matter of installing an exchange in Kilbourne.

NEEPAWA, Man.—A committee has been formed among the grainmen at Neepawa to formulate a system of municipal telephones for the Langford and Rosedale districts, to connect with the Neepawa civic system.

BESSEMER, Ala.—Several prominent business men in this city are interested in a project which has for its object the construction of telephone lines giving service to the farmers throughout this and adjoining counties.

WAVERLY, Ky.—A movement is on foot to establish a farmers' telephone system in this vicinity. W. F. Fowler, B. J. Mattingly, W. L. Norman and J. B. Spencer have been appointed to secure subscribers for the proposed system.

GALESBURG, Wis.—A number of stockholders of the Ettrick Farmers' Telephone Company were recently in conference with business men of this city in regard to organizing a company here and extending its line to Galesburg.

SPRINGFIELD, Ill.—The Egan Electric and Telephone Company has completed its organization and will soon begin the manufacture of telephones. The company controls several valuable patents on inventions by Charles Egan of this city.

SCRANTON, Pa.—An invention of a sound-proof telephone booth, but one with perfect ventilation, recently has been perfected by Miss Edythe B. Garney of this city. The Industrial Engineering Patent Company of Philadelphia reports the invention.

CLEVELAND, O.—The February payments to the employes of the Cuyahoga Telephone Company on the co-operative plan were larger than ever before, owing to the fact that the earnings of the company have greatly increased during the year.

BERRIEN CENTER, Mich.—Owing to dissatisfaction with the present telephone service a movement is on foot by the farmers of this vicinity to establish a new telephone system. The name of George M. Dean is mentioned in connection with the project.

PERU, Ind.—The Peru Common-Battery Lockout Telephone Company, just incorporated, has for its purpose the establishment of a manufacturing plant at Peru to manufacture and sell a device for a common-battery lockout telephone patented by Mark P. Boone.

PETERSBURG, Tenn.—Plans are being formed by Manager T. S. Pierce and his associates for greatly improving the service of the local telephone system. A number of new lines will be built and additional cable installed, and the service improved in every way.

MOREHEAD, Ky.—The action of the town council in granting a telephone franchise to the Big Sandy Telephone Company has aroused the owners of the Morehead Telephone Company, and the citizens are guaranteed an effective working telephone system in the immediate future.

BENSON, Ariz.—Dave Adams, a well known cattle man, has completed a telephone line from Benson to his ranch in the Dragoon mountains and has made arrangements to connect with the lines of the Tombstone Telephone Company. Mr. Adams intends to make further extensions.

BELLE PLAINE, Ia.—A number of farmers representing the various telephone lines which run into Belle Plaine recently held a meeting for the purpose of taking steps toward organizing a mutual telephone exchange here. A committee was appointed to secure the necessary franchise.

LA CROSSE, Wis.—A new device which will greatly facilitate party line telephones has been invented by Julius Storkerson of La Crosse and a patent applied for. By means of the instrument a four-party line can be transformed into one of eight, and two telephones be rung separately at the same time.

PUYALLUP, Wash.—The Puyallup Board of Trade has taken steps to introduce an Independent telephone system. The committee having the matter in hand consists of George D. Spurr, Fred J. Chamberlain, W. D. Cotter, W. E. Hale, and C. O. Westcott. It is claimed that the present system is too high and the service inadequate.

MEXICO CITY, Mex.—Grathan J. English, engineer of the Interstate Telephone Company of St. Joseph, Mo., and R. H. Dickey, secretary of the same company, have been in this city in the interest of a movement looking to the construction of connecting telephone lines between all the larger cities of the republic, with central office in this city.

BERTHOUD, Colo.—At the annual meeting of the Consolidated Home Supply Ditch & Reservoir Company a committee consisting of C. C. Clark, Will Bader and John Coleman was appointed to consider the matter of building an Independent telephone line along the route of the company's ditch connecting Berthoud, Loveland and Johnstown.

LAMBERTON, Minn.—At a recent meeting held in the interest of a local telephone system it was decided to organize at once with the intention of installing a local system and connecting with the farmers in this territory. Albert H. Emerson, L. Redding and George J. Grimm were appointed a committee to draft articles of incorporation and by-laws.

LACONIA, N. H.—The action of the town of Plymouth in granting a franchise to the Baker River Telephone Company is expected to result in the opening of an Independent system reaching from Penacook to the Canadian border, as it is expected that the lines of the Citizens' company at this place will connect with the Baker River lines at Plymouth.

CALIFORNIA, Pa.—The Union Telephone Company, which has been in operation about three years, has made arrangements for connection with the Centerville Company. The company also has under consideration the connection with several other systems and before long will likely give connection with Pittsburg and Uniontown and other intervening towns.

LUTHER, Ind.—An effort is being made to convert the Luther Telephone Company into a mutual concern. Mr. J. J. Swartz, one of the officers, states that about $6,000 worth of new stock has been sold and future prospects look brighter for the company being placed in better condition financially. Every effort will be made to place the company on a paying basis.

GALESBURG, Ill.—Representatives of sixteen Independent telephone exchanges in this part of the state recently met in this city to complete an organization for the betterment of its long-distance and toll business. Officers were elected as follows: President, W. J. McQuiston, Monmouth; vice-president, C. M. Erwin, Macomb; secretary-treasurer, R. G. Roadstrum, Galesburg.

DES MOINES, Ia.—The mutual telephone companies of the state are demanding that they be placed on an equal footing with the Iowa Telephone Company, which has a perpetual franchise. At their request Senator Young has introduced a bill extending all existing franchises of telegraph and telephone companies so that they will expire at one time, or, in other words, not expire at all.

SERGEANT, Ky.—The Beaver-Hindman Telephone Company is extending its lines from Hindman to Colson, where connection will be made with the Whitesburg Telephone Company, giving connection with Whitesburg, Harlan, Hindman, Hazard, Prestonsburg and every important town in eastern Kentucky. The Whitesburg Company's lines are being extended to all parts of the county.

MONTREAL, Que.—The Quebec section of the Union of Canadian Municipalities passed a resolution in favor of municipal control of telephones, asking the Quebec legislature to memorialize parliament to refuse the Bell Telephone Company an increase in its capital stock unless subject to municipal regulation and provincial control. The union also urged the legislature to construct long distance telephones

EGG HARBOR CITY, N. J.—The Egg Harbor City Telephone Company is reported to be in a prosperous condition. Although the company has been in operation but a short time, it has a large number of subscribers and new ones are being constantly added. The officers of the company are: President and manager, Geo. W. Otto; vice-president, Henry Voss; secretary, H. C. Schliehting; treasurer, Lorenz Krein.

GALESBURG, Ill.—The Galesburg Union Telephone Company has just completed its new exchange building and the same will be occupied by April 1. When completed this will be the best arranged and most modern plant in the country. The total cost of the building and furnishings, including the switchboard, will exceed $50,000 and when once in operation the management promises to furnish the best service possible to be given.

HIAWATHA, Kans.—Representatives of mutual telephone systems at Huron, Brenner, Bedena, Leona, Robinson, Willis, Powhattan, Fairview and Hamlin in Kansas and Preston and Salem in Nebraska recently met in this city and formed a temporary organization by electing the following officers: President, Frank Shaw, Hiawatha; secretary, W. H. Gresh, Salem, Neb.; treasurer, G. W. Karrenbrock. A permanent organization will be formed later.

JOHNSTOWN, Pa.—At a recent meeting of the Merchants' Association of Johnstown, a resolution was adopted declaring in favor of supporting the Johnstown Telephone Company exclusively, so long as it operates under the present policy and maintains the present schedule of rates. This in view of the fact that the rates are about one-half former Bell rates and the company is giving satisfactory service; also to reduce the expense of maintaining two telephones.

KANSAS CITY, Mo.—At a meeting of the representatives of the Independent telephone companies recently held at this place the organization of the Independent Telephone Association of Missouri was perfected by the election of the following officers: President, W. B. Scuggs, Harrisonville; secretary and treasurer, Houck McHenry; vice-presidents, A. T. Ralston, G. A. Barnes, Houck McHenry, C. A. Raine, W. Ray McCanne, G. W. Schwerr, J. W. Lane, J. W. Hale.

BUNCETON, Mo.—A movement is on foot to merge all the Independent telephone companies in Cooper county. At a meeting of the stockholders of the several Independent companies resolutions and recommendations were adopted providing for the incorporation of the Cooper County Telephone Company, with a capital stock of $150,000, for the purpose of building trunk lines between the towns

of Cooper county. The company expects to have 4,000 telephones and will build 182 miles of trunk line. Colonel John S. Elliott, Charles A. Sombert, E. Cramer, N. A. George, and Dr. J. T. Taylor were named as an executive committee.

GIBTOWN, Tex.—The Gibtown Telephone Company, which began business two years ago with four neighborhood telephones, now has about 100 miles of line and sixty telephones in service and is one of the most prosperous small rural telephone systems to be found. It has connections with Jacksboro, Groveland, Joplin, Vineyard, Knob, Reno, Whitt, Springtown and Weatherford, and through the latter place with north and south Texas. W. G. Mask is manager and principal stockholder.

WILLACOOCHEE, Ga.—The Denton Telephone Company, operating a local telephone exchange at this place, and with long-distance lines throughout the county, has placed itself under the jurisdiction of the Georgia railroad commission. This is the first telephone company to take advantage of the act of August 22, 1905, which gives companies the right to condemn right-of-ways when they place themselves under the railroad commission. By so doing the commission is given the right to regulate telephone tolls within the state.

INDIANAPOLIS, Ind.—At a meeting of the directors and officers of the Indianapolis Telephone Company it was finally decided to ask permission of the city to increase telephone rates. New trunk lines will be constructed to Fort Wayne, Louisville and Richmond. The new lines will be No. 8 copper wire to replace the No. 10 now in use. Orders were also given to make additions to the equipment in Indianapolis to take care of the new business. General Manager A. L. Tetu will have charge of the proposed improvements and extensions.

RALEIGH, N. C.—The Retail Merchants' Association at a recent meeting passed resolutions in favor of the service of the Raleigh Telephone Company to the exclusion of the other companies. The only proviso to the action was that the Raleigh company enlarge its plant, increase its service and make its capacity adequate to the demands of the city. It was stated that $30,000 can be expended if necessary, by the Raleigh Telephone Company. The association is confident that the citizens of Raleigh will sustain its action and uphold it in its effort to reduce the number of telephone systems in Raleigh.

OAKLAND, Cal.—The Home Telephone Company of Alameda county, which is backed by the same financial interests that are behind the Home company of San Francisco, has been granted a franchise in Oakland for fifty years on the following conditions: After five years the company, according to state law, is to pay the city two per cent of gross earnings. The city is to have free use of one conduit throughout the underground system and the use of all surface poles and connections. The city is to have free use of fifty telephones. The company guarantees to expend, under a $100,000 bond, $875,000 in three years.

PLYMOUTH, N. H.—Up to the present time Independent telephone companies have been shut out of Plymouth, it being the home of the Plymouth and Campton Telephone Company, which is connected with the Bell lines. The Baker's River Telephone Company has made special effort to get a permit through the town and has just been rewarded by having the town vote unanimously in its favor. This opens up the way so that the Baker's River Telephone Company will connect the Independent lines of the North with the Independent lines of the South, so that New Hampshire will now have Independent service with trunk lines for long-distance work. The headquarters of the company is Warren, N. H.

FT. WAYNE, Ind.—At the annual meeting of the stockholders of the National Telephone & Telegraph Company it was voted to accept the recent proposition of the Home Telephone Company for the purchase of the Independent toll lines owned by the National company, and the transfer will be made within sixty days. The purchase was made on the basis of 90 per cent of the par value of the National stock, 6 per cent preferred stock of the Home company being issued in payment. The Home company in its offer also specified that it would issue $100,000 worth of additional stock to provide for extensions to the toll lines. The purchase includes about 1,000 miles of Independent toll lines about Fort Wayne, with local exchanges at Sturgis, Kendallville, Auburn, New Haven, Avila and other points.

PROVIDENCE, R. I.—By an act recently introduced in the legislature, the holdings in the New England Shaver Telephone Company, incorporated in 1891, have been secured by new interests, who wish to change the name of the corporation to the Home Telephone Company and to increase the capital stock from the original amount, $275,000, to $2,500,000, and issue bonds to the amount of $150,000,000. The bill also gives the company the right to establish telephone service in the state. It was the intention of the company at the time of its organization to establish a plant when by a decision of the Supreme Court, which bore directly on the rights of the new company through the patents by which the Bell company were protected, the outlook for long litigation caused the abandonment of the project about two years after the incorporation, since when the charter has been dormant.

TOLL LINES AND WHAT THEY MEAN TO US.

It needs no elaborate discussion to convince the exchange manager of our crying need for toll lines, the thing that is giving us more concern in our competition with the Bell companies.

We now have more exchanges in this state than the opposition and far more subscribers; then it but remains for us to supply efficient and sufficient toll lines to properly connect our several exchanges binding them together into one unbreakable chain, safe from the allurements held out by the sub-license contract, increasing the value of our exchanges, insuring the stability of the investments and giving standing to Independent telephone securities in the open market.

You owe it to yourselves to use all of your influence and energy toward building or inducing others to build efficient toll lines in your territory, as you will find especially in the state of Iowa that the opposition making every effort to secure connecting contracts with isolated Independent exchanges, under almost any conditions that you might name, in this way using one exchange to help them in their fight against the others, incidentally making sub-licenses work against their own interests.

Again I say our need is efficient toll lines, through and local circuits that will give prompt, clear cut service. Let us give every encouragement to the Independent toll line companies, and the only way that this can be done is to make these investments profitable. We cannot hope to hold the isolated exchanges in our ranks by their love for the movement that we represent alone; but must be able to supply them the same class of toll service that they can secure for their patrons from the Bell company. We must hurry this along. Many a telephone manager has placed himself in the ranks of the opposition because they thought only of the needs of the to-day without thought for the future. Help these men by showing them that the lines they need are not only coming as they must but are now under way.

Among the things that have stunted the growth of the Independent toll lines is the great amount of free service that has been supplied in the past. There may be instances where flat rate intertown service is advisable for neighboring points, but I am unable to see where unlimited free service will be to the best interests of any concerned. It cannot help but cripple your local service and work a hardship on the many for the benefit of the few. We cannot hope to have investments made in toll lines if they are to be paralleled by free service lines. The public has become prejudiced against the toll service which has been rendered by the Independent companies in the past, and looks to the opposition when they want long distance service. This must be changed, and when it is, together with our great advantage in exchanges the combination will be irresistible. Again, if we, as small exchanges, are unable to make the necessary investments, let us extend an open hand to those that are, that there may be no delay in completing these much needed circuits and there will be but little of this sub-license business.

To those who have toll lines, no matter how small these interests may be, let us get on a basis that is right. Identify yourselves with the Independent Telephone Clearing House Association which has been established for the purpose of checking all of the interchange toll business between the different companies as well as the business over your own lines if you so desire.

Make contracts and working agreements with each other in writing, insuring stability to the arrangements and ward off misunderstandings. At the last meeting of this association suggestions were made and a resolution passed fixing what was considered just and equitable terms between the toll and exchange companies.

Let us feel that this organization is not in existence but twice a year and then at the meetings, but that a lodge in which the fellowship is continued throughout the year, a lodge of "modern boosters" for the mutual and Independent (if there be a difference), movement. Establish a lodge in every city, town, and village and for the badge, that we may know one another, we'll use the shield. The National-Interstate Telephone Association has been established to look after our interests as a national body and have sent out as our unity cry "Look for the Shield." Put the shield on your signs, letter heads, envelopes, cards, and wear a shield button on the lapel of your coat. Let every man wear a shield, talk and think shield. "Look for the Shield" and boost for the cause that the shield represents. If you see a man without the shield, ask him why. When we have this band of "modern boosters" organized we will have something done in the toll line business. We have been busy looking to our local service and exchanges. We must now have the toll lines. Boost them.—*Paper read before the Northwestern Iowa Telephone Convention at Vinton, Iowa, February 13, 1906, by R. A. Walker.*

The Atchison Globe says: "The telephone girls have more patience than any other class of women in the world; if we ever marry again, we intend to marry a telephone girl." It is difficult to determine whether the Globe man wants to jolly the girls into giving the Globe a more prompt service, or only wants to get up a fight with his wife.—*Superior (Wis.) Sun.*

ITEMS FROM THE RURAL LINE DISTRICTS

Illustrated by R. McMahon

The "Lake Shore" telephone line have their poles up.—*Midway Correspondent in Estherville (Ia.) Republican.*

The telephone gang is putting up the telephone through Torrance.—*Torrance Notes in Winfield (Kan.) Courier.*

John Frazier has resigned as teamster for the telephone company.—*Union Center Jottings in Hartford City (Ind.) Gazette.*

Simpsonville folks are happy. A telephone line connects them with the outside world.—*Simpsonville Notes in Louisville (Ky.) Post.*

Miss Pearl Hemphill has taken a position at the switchboard of Coon's telephone exchange.—*Fisher Correspondent in Bloomington (Ill.) Parogram.*

Dodge county desires free telephone service for officers in exchange for use of bridges for stringing wires.—*Dodge County Items in Omaha (Neb.) Bee.*

A. B. Currie, Walton, trouble man for the telephone company, was in the city looking for trouble.—*Rural Correspondent in Logansport (Ind.) Journal.*

Some of the telephone gang boys had hard times finding lodging, owing to their being so noisy. They finally got shelter under the condition that they would keep quiet.—*Jackson Items in St. Paul (Minn.) Dispatch.*

The farmers northeast of her have formed a company and are going to run a telephone in to Longford. The line is to start from Mrs. Plummer's and run three-fourths of a mile north and then three and one-half miles east, then north into town.—*Vine Creek (Minn.) News.*

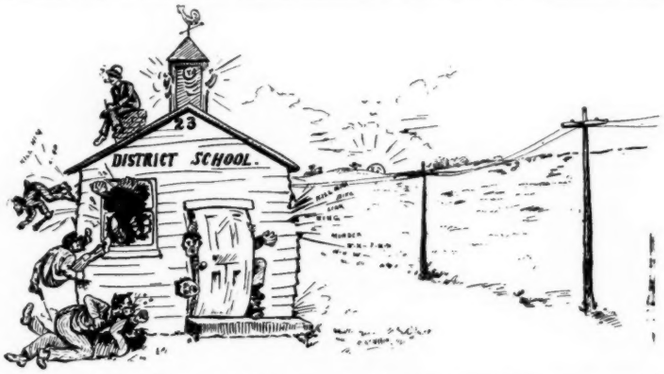
The Mutual telephone line between Cooper and Rippey via Coon Valley bridge is to be divided at the river and a commercial wire put on. At present there are nineteen on one wire, but with the new division two wires will serve.—*Franklin Happenings in Jefferson (Ia.) Bee.*

Jewell County Telephone Company, attention! The above company's line runs by P. A. Hawk's place, but the Farmers' line intends to run a wire from A. A. Brown's, 1¼ miles, and put in a telephone for J. C. Hawk, who rents the place.—*Pleasant Ridge Rumblings in Mankato (Kan.) Western Advocate.*

Exchange Manager F. Trautwein of the Farmers' Mutual Telephone Company informs us that the company will in the near future issue a new directory, and he is now engaged in securing advertisements for the same. The ones who have the power to authorize the publication of such are meeting with the approval of business men, as they allow no advertisement of a merchant to be entered who is not in a field they cover.—*Morrison Items in Clinton (Ia.) Herald.*

The Interstate Telephone Company had a force of men straightening poles and tightening the wires along their lines in this town last week.—*Will Items in Joliet (Ill.) Republican.*

Learning a few days ago that there were prospects of a big telephone meeting up in Lincoln township, we detailed our correspondent to attend and write it up. He got back in the wee hours of the morning, not much the worse in looks (impossible) for his experience. From what he relates we find we made a mistake in not sending our special war correspondent and artist. The meeting was



held at the Coleman school house, Lincoln township, to transact some telephone affairs, usually a simple performance. But not so at this meeting. The manner in which those Lincoln farmers blacked each other's eyes and pulled hair was amazing! A few fines and a whole lot of consolation is all that has resulted as yet.—

As early this spring as the weather will permit the Hancock County Rural Telephone Company will have an inspection of each town and rural telephone, testing them in different ways. Quite a number of the wires in this vicinity will be rewired from the house to the main line.—*Kenawha Notes in Britt (Ia.) News.*

Harrisburg isn't going to stand it much longer. The Bulletin says: "The telephone company contemplates putting in an instrument which will, when attached to a line, tell whose telephone is down, and this will enable the operator to tell who is hanging onto the line and listening to conversations which are not intended for them.—*Harrisburg Notes in Portland (Ore.) Telegram.*

The Martinton Telephone Company being unable to repair their lines speedily, Antoine Allen, Maurice Horan, Geo. Moody and David Whiting made a vountary contribution of their labor to the company and fixed the line running west on the county line themselves. People sadly miss the luxury of a telephone when they are accustomed to their use.—*Martinton Jottings in Kankakee (Ill.) Times.*

The Gila Bend telephone line via the Buckeye line, that was washed out by the floods and remained so for nearly a year, has been repaired and the line is now "talking" as well as a first-class politician and far more effectively. It is now possible for Gila Bend people to hold conversation with the greater part of the territory or as much of it as any other town may, for the Buckeye line connects with the Phoenix exchange. Some of the intermediate points between Phoenix and Gila Bend are Bill Moore's ranch on the Agua Fria, Arlington, Wolfley dam, and Noonan's ranch, as well as the numerous telephones in the Buckeye exchange, and on ranches between Wolfley dam and Gila Bend.—*Gila Bend Notes in Phoenix (Ariz.) Republican.*

Democracy with a telephone heading. Last week's Courier dressed up Miss Democrat and put a telephone bonnet right upon her maiden head. "County Lines Being Brought Into Oregon City —Switchboard on the Way"; then all present indorsed the governor because he is in favor of telephone exchange in Oregon City, too. Presume the switchboard is "Hedges," who is to manipulate the "Jacks" so that the voting circuit will cut from Brownell-Porter to Hedges. Then when we read on, names appear quite telephonic and familiar, until it seems difficult to realize what the exchange will be. Then we "Wait" and read on down the list: Jesse, Harding, Starkweather, Gans, Stafford. Why, if the heading was just "switched" a trifle more, it would answer fairly well for the reading of a Lewis and Clark Fair committee getting ready to solicit exhibits of the county's resources.—*Molalla Items in Oregon City (Ore.) Courier.*